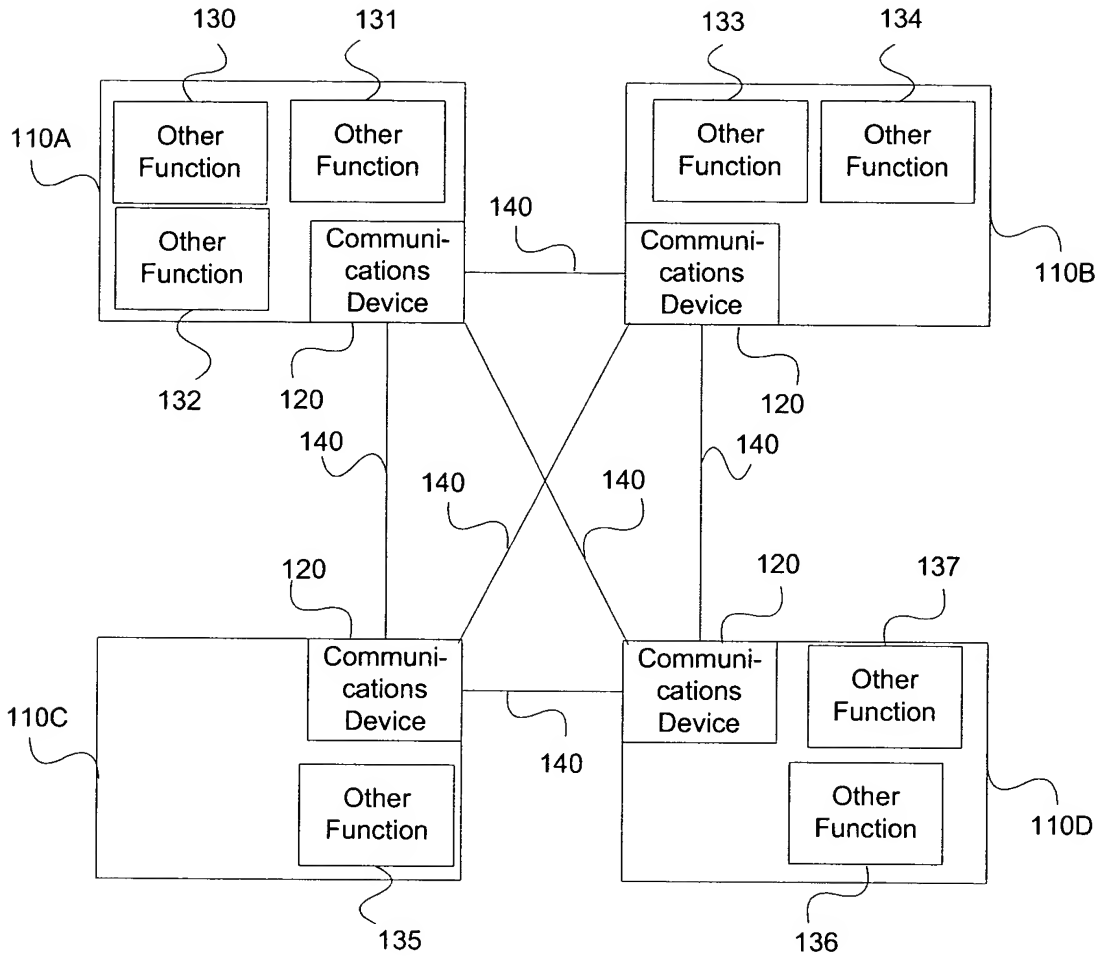
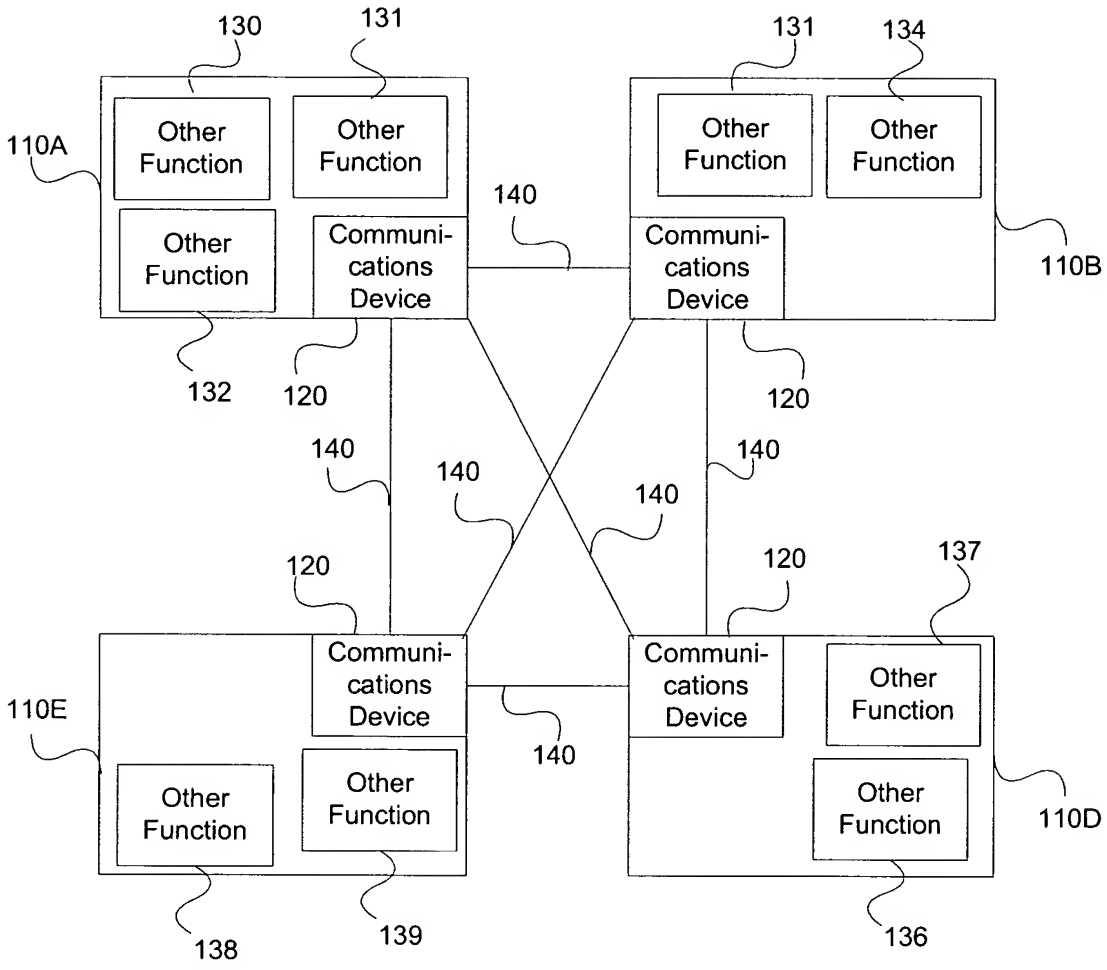
FIG 1A


130
131
133
134
110A
Other Function
Other Function
Other Function
Other Function
Other Function
Communi-cations Device
Communi-cations Device
110B
140
132
120
120
140
140
140
140
120
120
137
Communi-cations Device
Communi-cations Device
Other Function
110C
140
Other Function
Other Function
110D
135
136

100A

FIG 1B


130
131
131
134
110A
Other Function
Other Function
Other Function
Other Function
140
Communi-cations Device
Communi-cations Device
110B
132
120
120
140
140
140
140
120
120
137
Communi-cations Device
Communi-cations Device
110E
Other Function
Other Function
Other Function
Other Function
140
110D
138
139
136

100B

FIG 2A

ID	Manufacturer
0	Unknown/Unassigned
1	Mfg. A
2	Mfg. B
3	Mfg. C

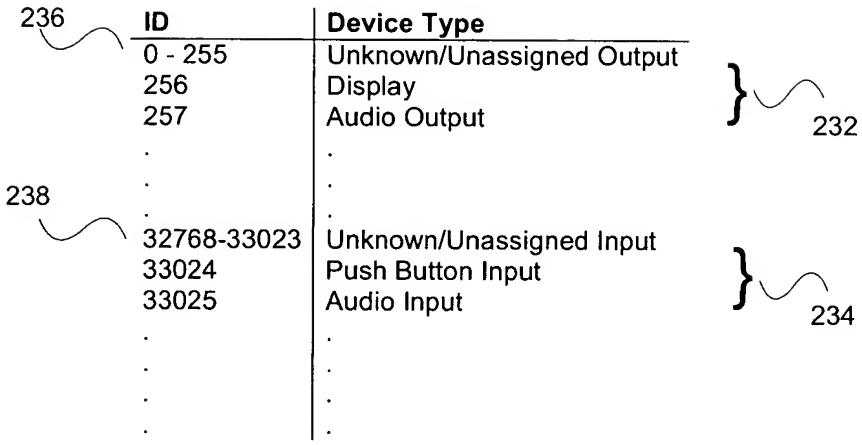
210

FIG 2B

ID	Model/Mfg. A
0 - 255	Unassigned
256	Model A
257	Model B
258	Model C

220

FIG 2C



230

FIG 2D

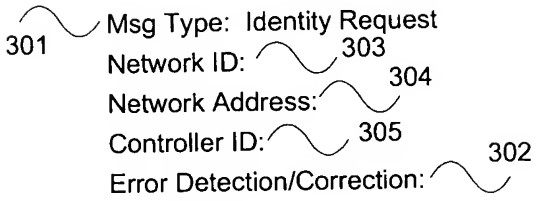
Device Type 257

Capability	Type	Range
1	Stereo	Yes/No
2	Volume Control	Yes/No
3	Volume Level	Number of Levels

242
244
246

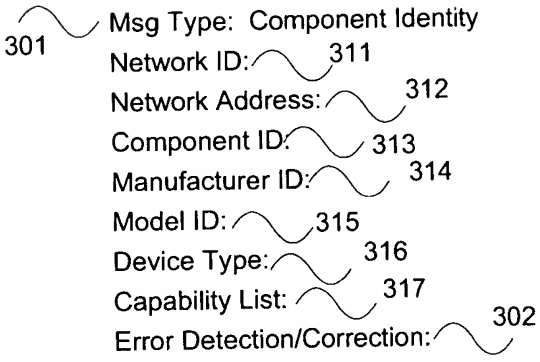
240

FIG 3A



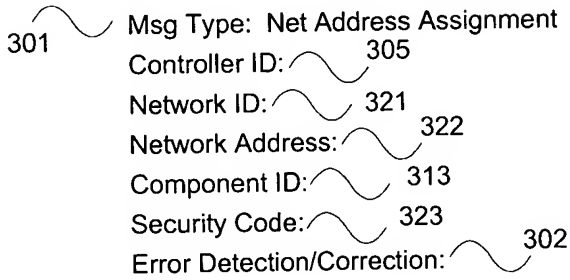
300

FIG 3B



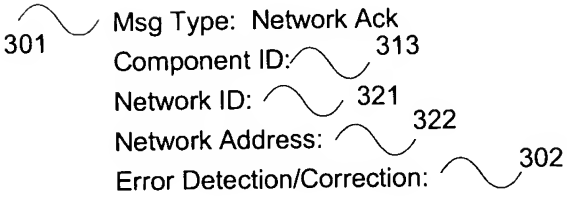
310

FIG 3C



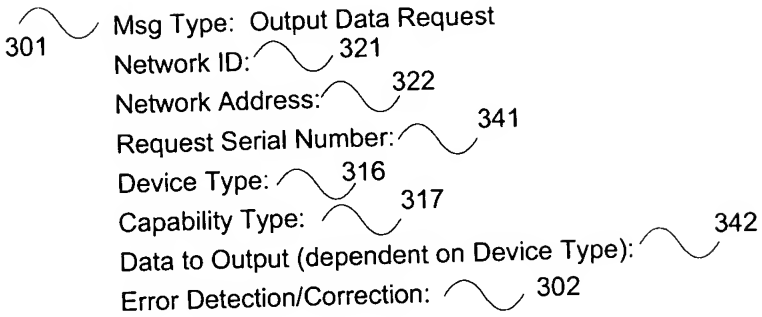
320

FIG 3D



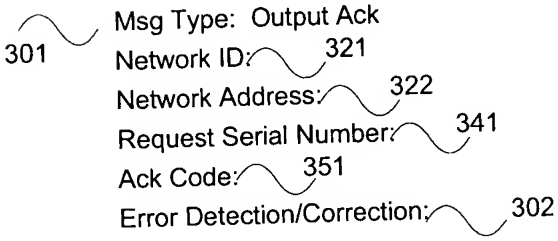
330

FIG 3E



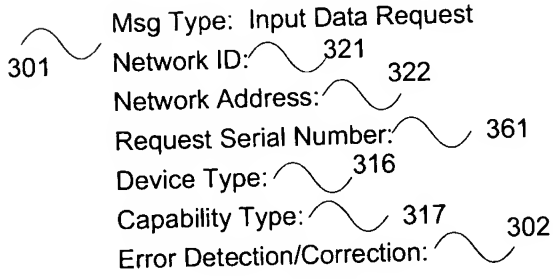
340

FIG 3F



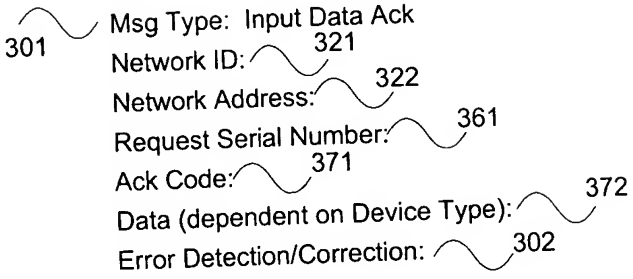
350

FIG 3G



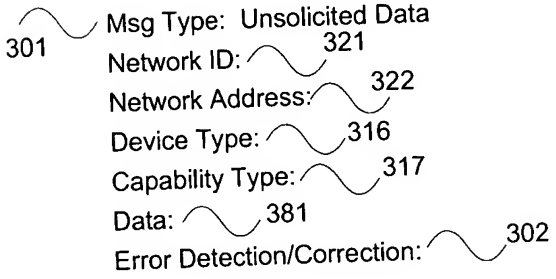
360

FIG 3H



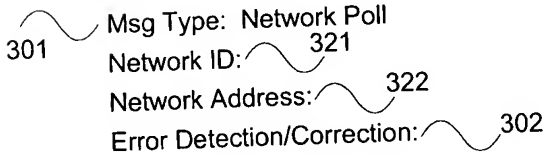
360

FIG 3I



380

FIG 3J



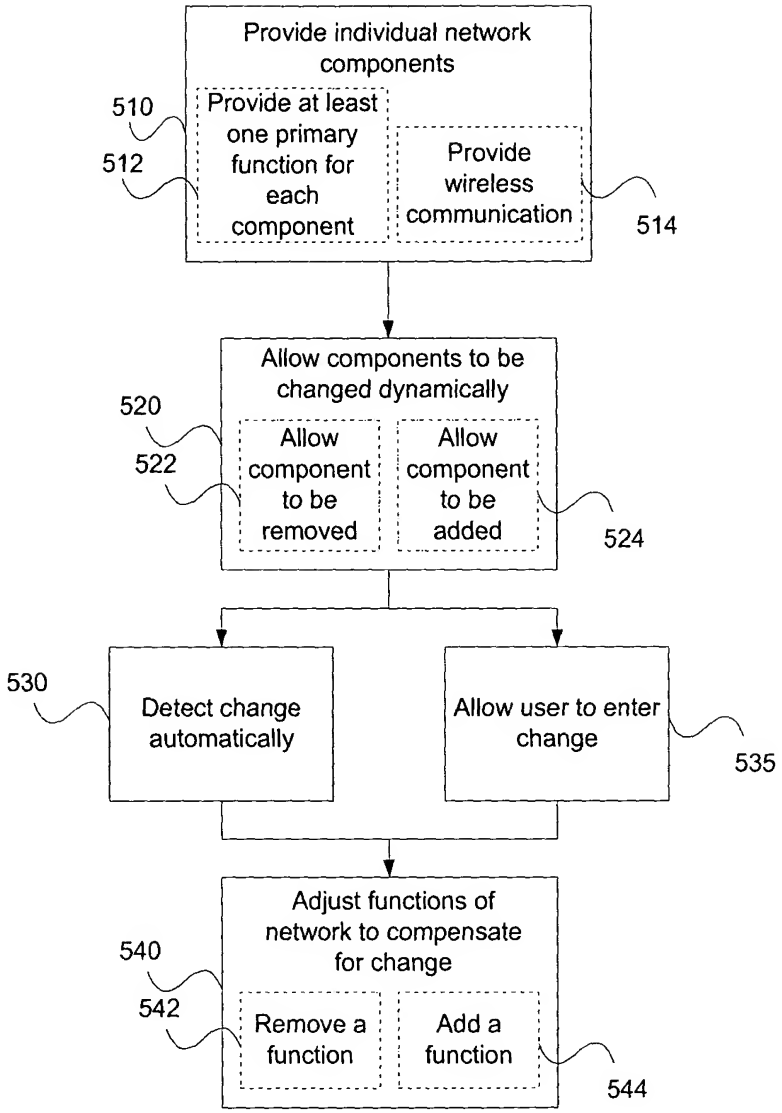
390

FIG 4

410 Network Address	420 Component ID	430 Manufacturer	440 Model	450 Device Type	460 Capability	470 Active
1	55555	2	506	701	1 / 4	Yes
2	66666	2	510	42163	1 / 1 , 2 / 0	No
3	77777	4	1062	891	1 / 10	Yes
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.

400

FIG 5


Provide individual network components
510
Provide at least one primary function for each component
512
Provide wireless communication
514
Allow components to be changed dynamically
520
Allow component to be removed
522
Allow component to be added
524
530
Detect change automatically
Allow user to enter change
535
Adjust functions of network to compensate for change
540
Remove a function
542
Add a function
544

500

FIG 6A

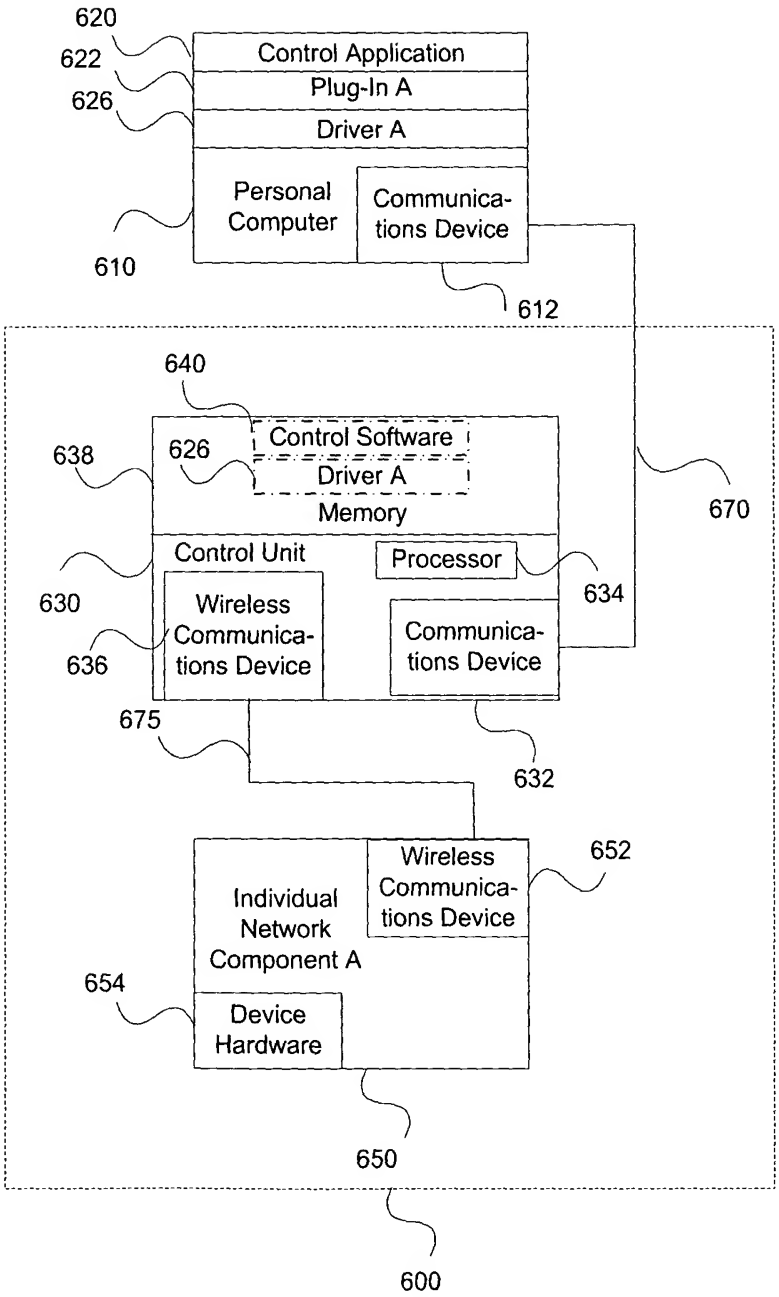

620
622
626
Control Application
Plug-In A
Driver A
Personal Computer
Communica-tions Device
610
612
640
638
626
Control Software
Driver A
Memory
670
Control Unit
Processor
630
634
Wireless Communica-tions Device
636
Communica-tions Device
675
632
652
Wireless Communica-tions Device
Individual Network Component A
654
Device Hardware
650
600

FIG 6B

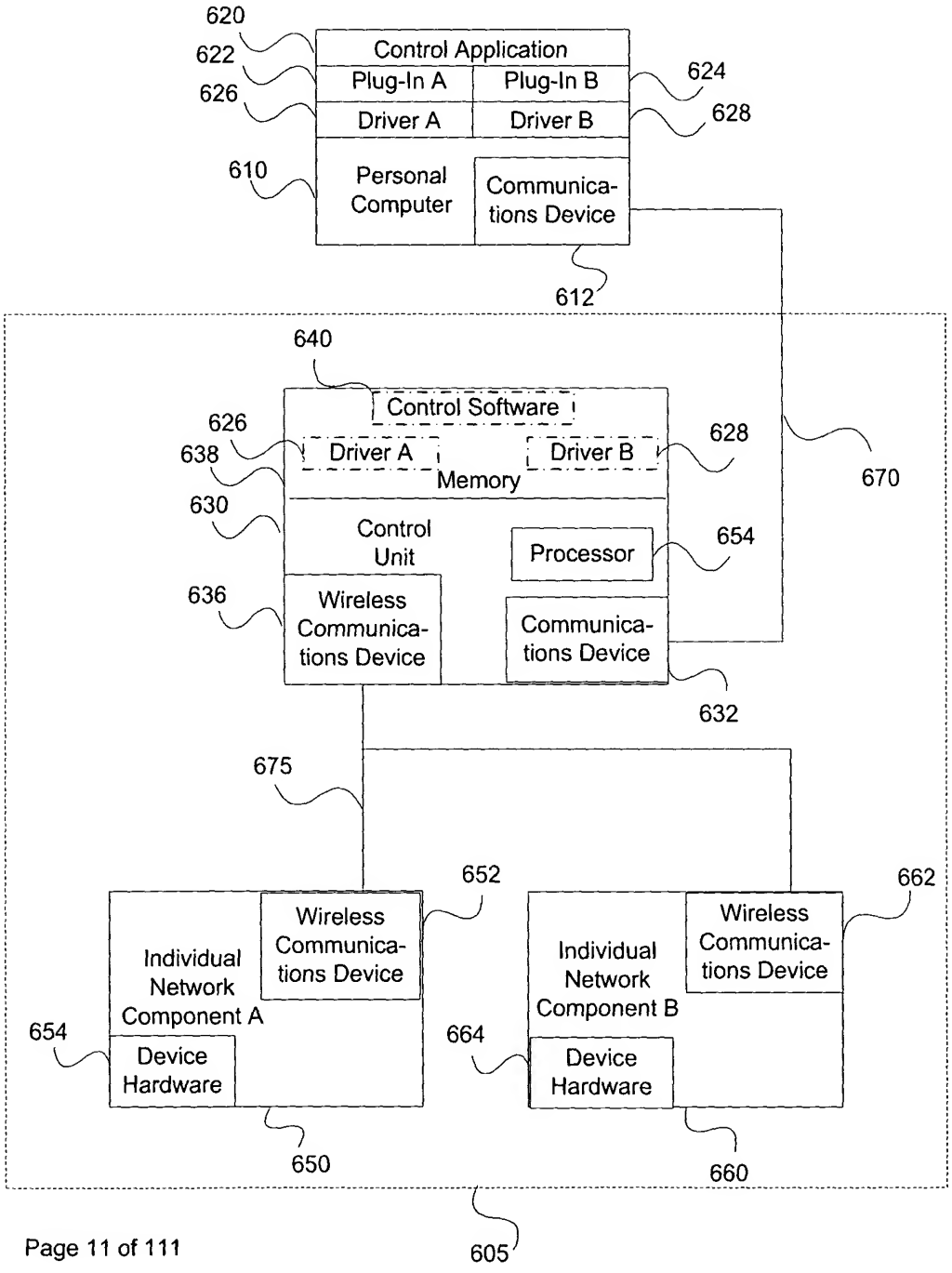

620
Control Application
622
Plug-In A
Plug-In B
624
626
Driver A
Driver B
628
610
Personal Computer
Communica-tions Device
612
640
Control Software
626
Driver A
Driver B
628
638
Memory
670
630
Control Unit
Processor
654
636
Wireless Communica-tions Device
Communica-tions Device
632
675
652
662
Individual Network Component A
Wireless Communica-tions Device
Individual Network Component B
Wireless Communica-tions Device
654
Device Hardware
664
Device Hardware
650
660
605

FIG 7

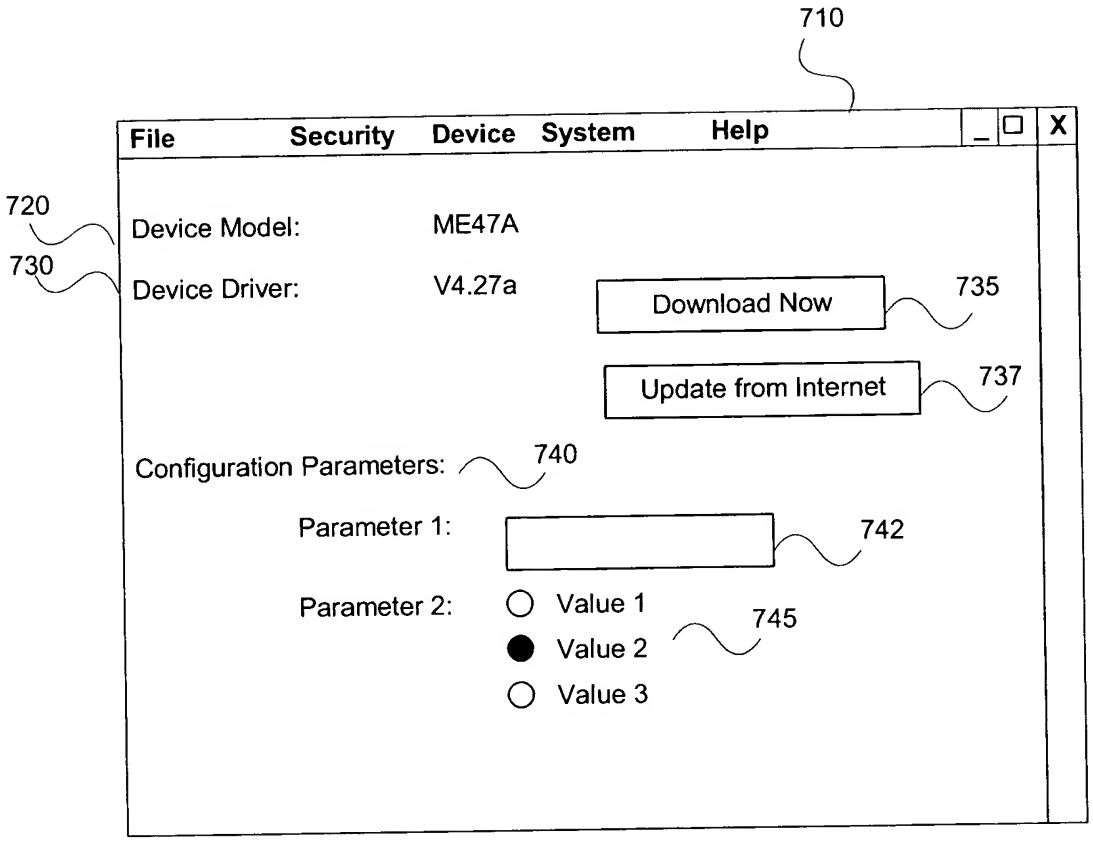
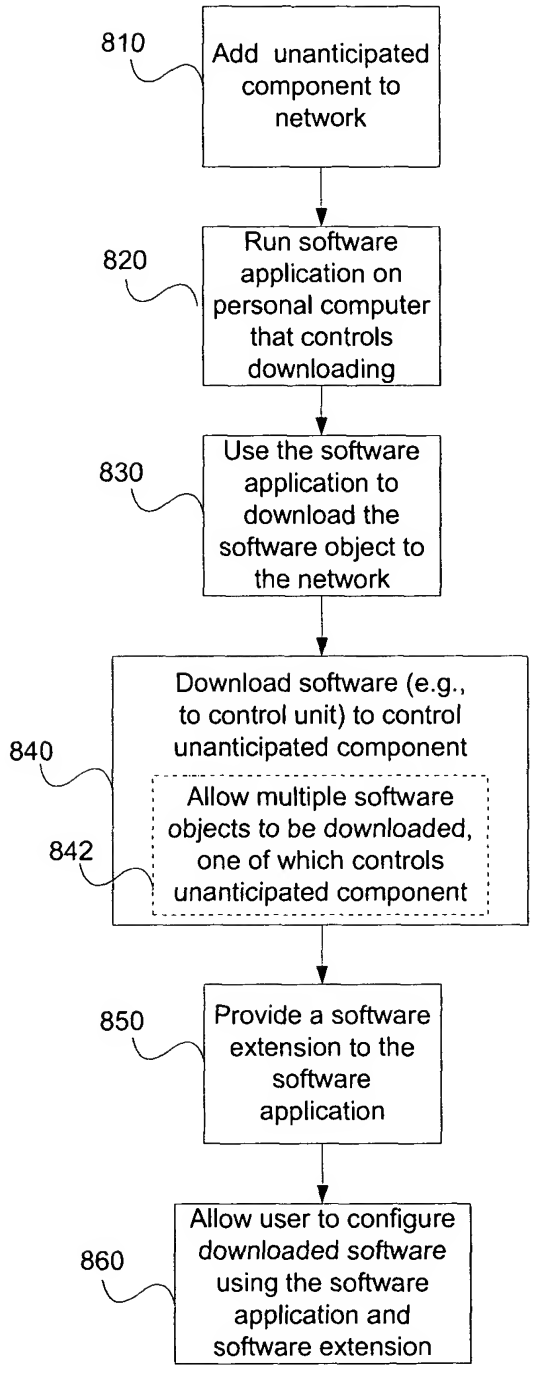
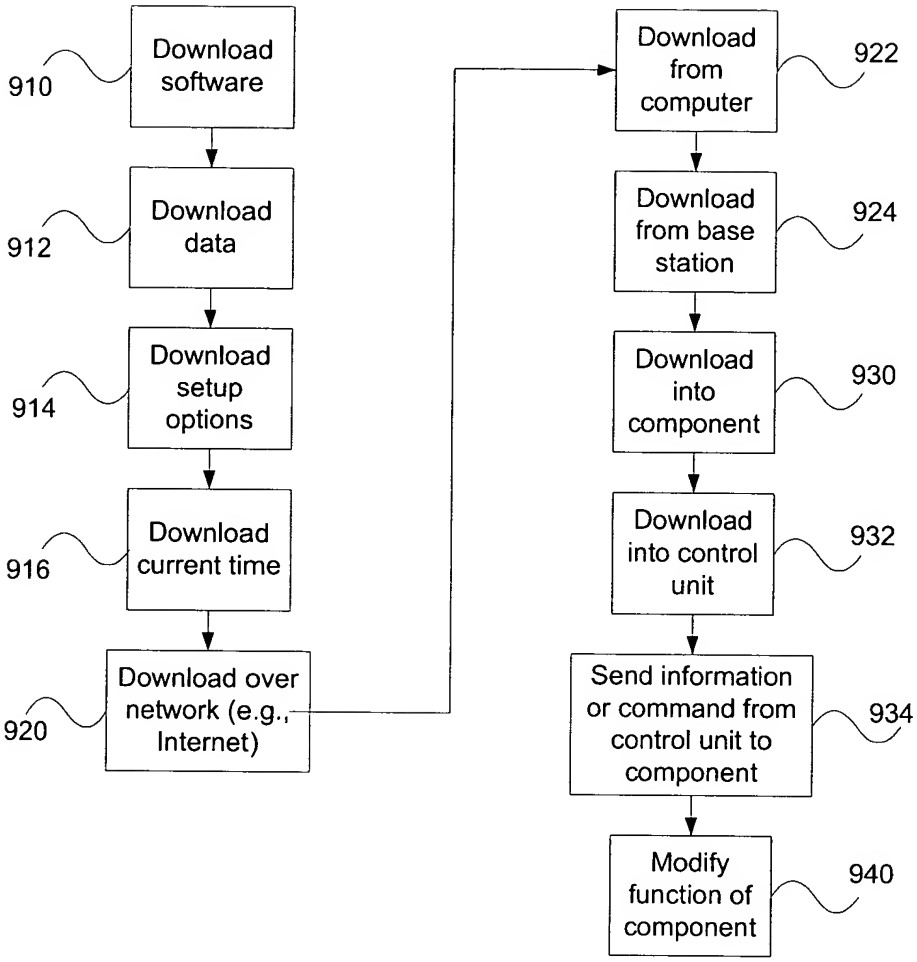

710
File
Security
Device
System
Help
720
Device Model:
ME47A
730
Device Driver:
V4.27a
Download Now
735
Update from Internet
737
Configuration Parameters:
740
Parameter 1:
742
Parameter 2:
Value 1
Value 2
Value 3
745
700

FIG 8


810
Add unanticipated component to network
820
Run software application on personal computer that controls downloading
830
Use the software application to download the software object to the network
840
Download software (e.g., to control unit) to control unanticipated component
842
Allow multiple software objects to be downloaded, one of which controls unanticipated component
850
Provide a software extension to the software application
860
Allow user to configure downloaded software using the software application and software extension

800

FIG 9


Download software
910
Download data
912
Download setup options
914
Download current time
916
Download over network (e.g., Internet)
920
Download from computer
922
Download from base station
924
Download into component
930
Download into control unit
932
Send information or command from control unit to component
934
Modify function of component
940

900

FIG 10

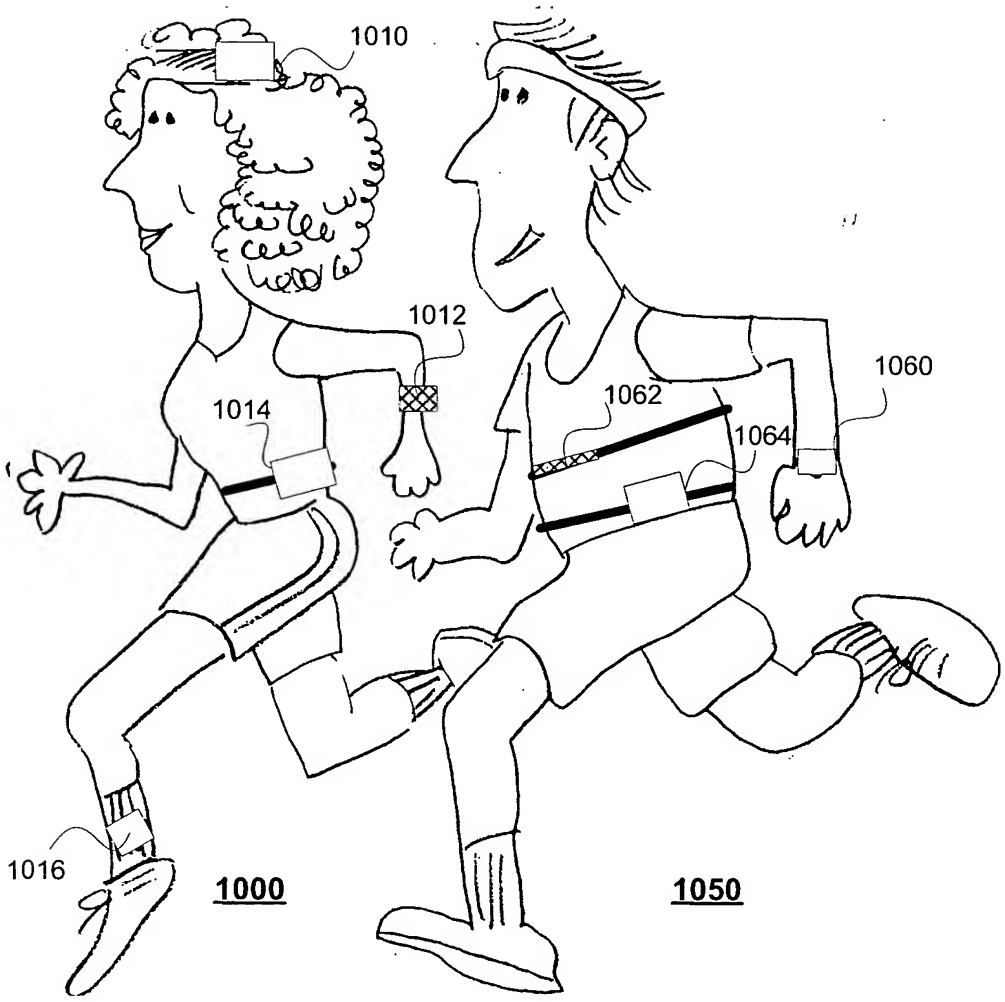
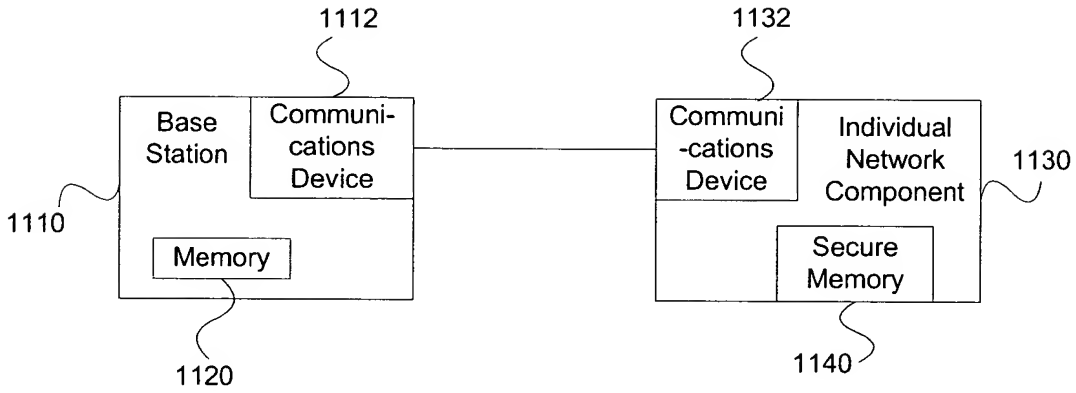
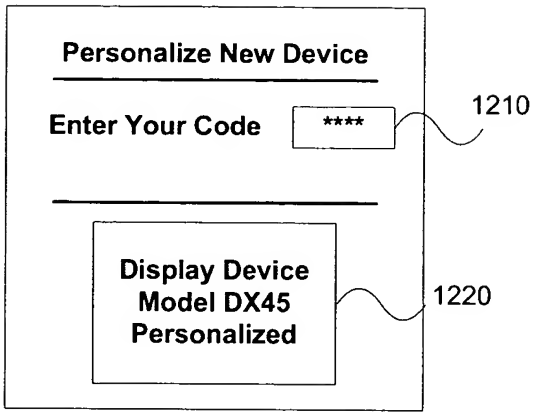


FIG 11


1112
1132
Base Station
Communi-cations Device
Communi-cations Device
Individual Network Component
1130
1110
Memory
Secure Memory
1120
1140

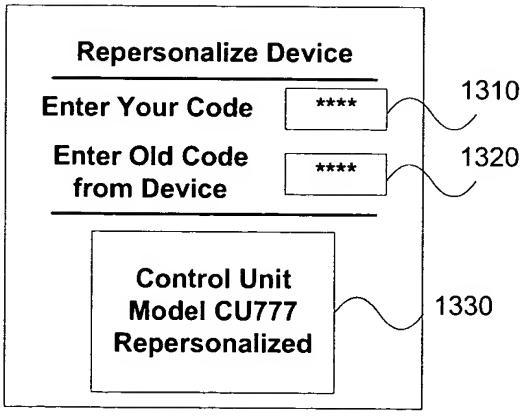
1100

FIG 12



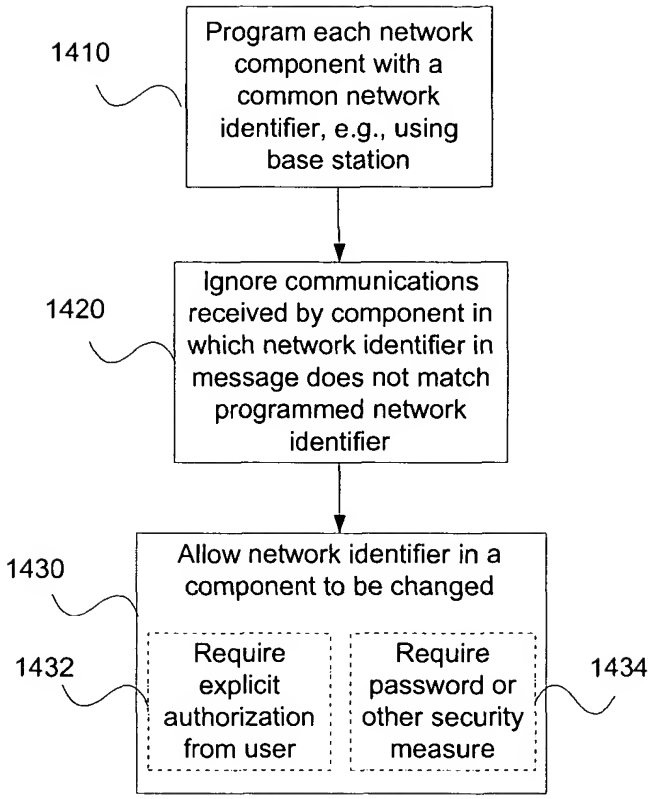
1200

FIG 13



1300

FIG 14


1410
Program each network component with a common network identifier, e.g., using base station
1420
Ignore communications received by component in which network identifier in message does not match programmed network identifier
1430
Allow network identifier in a component to be changed
1432
Require explicit authorization from user
Require password or other security measure
1434

1400

FIG 15

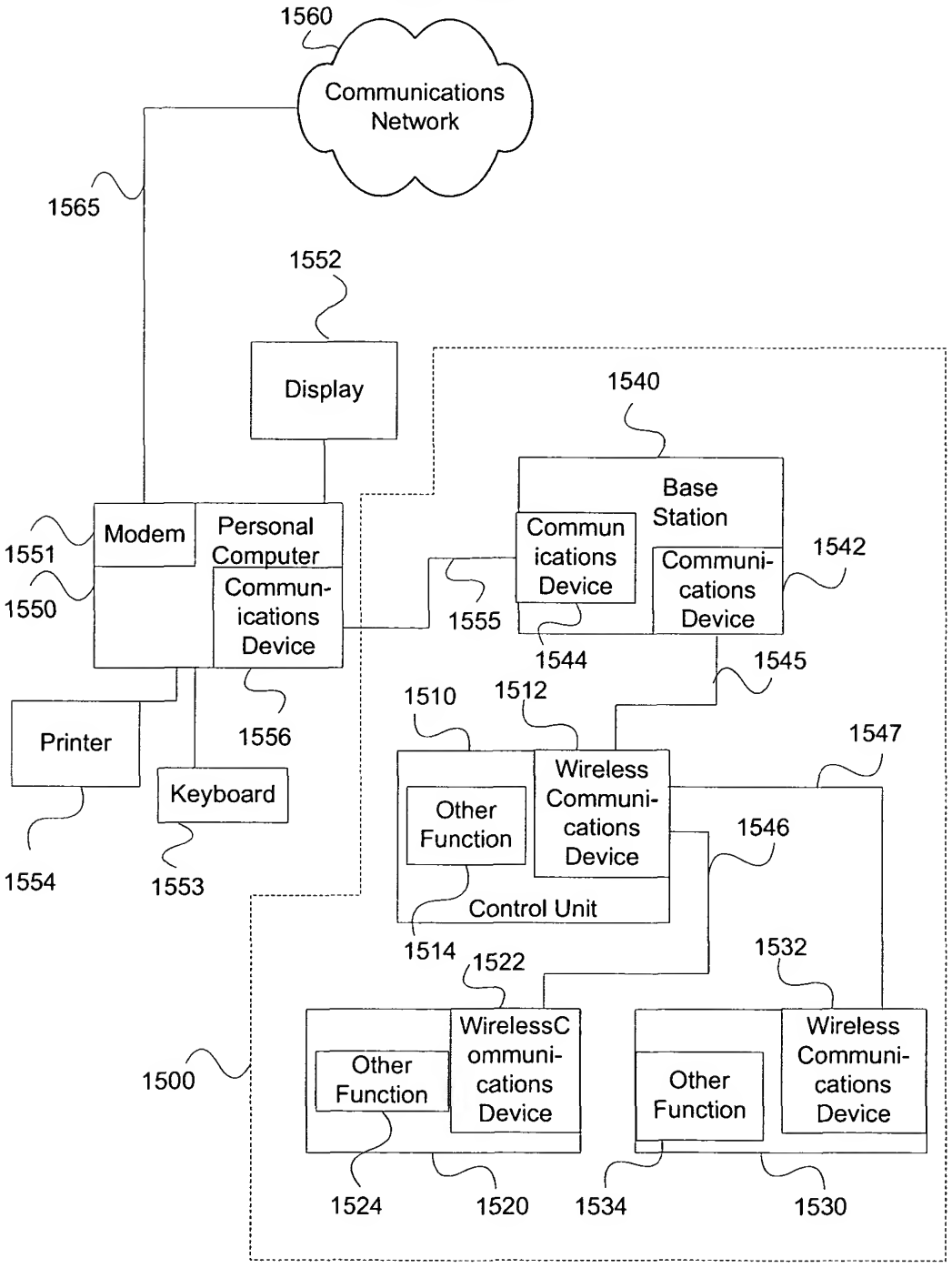
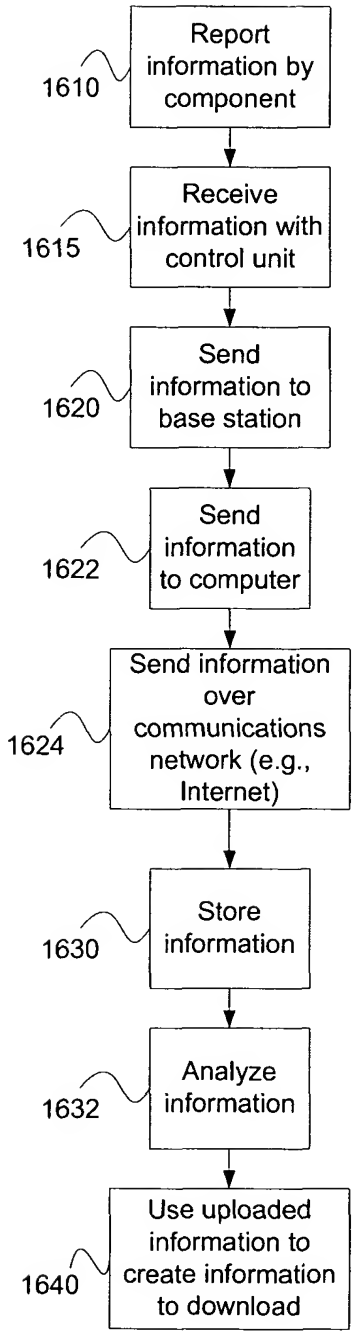
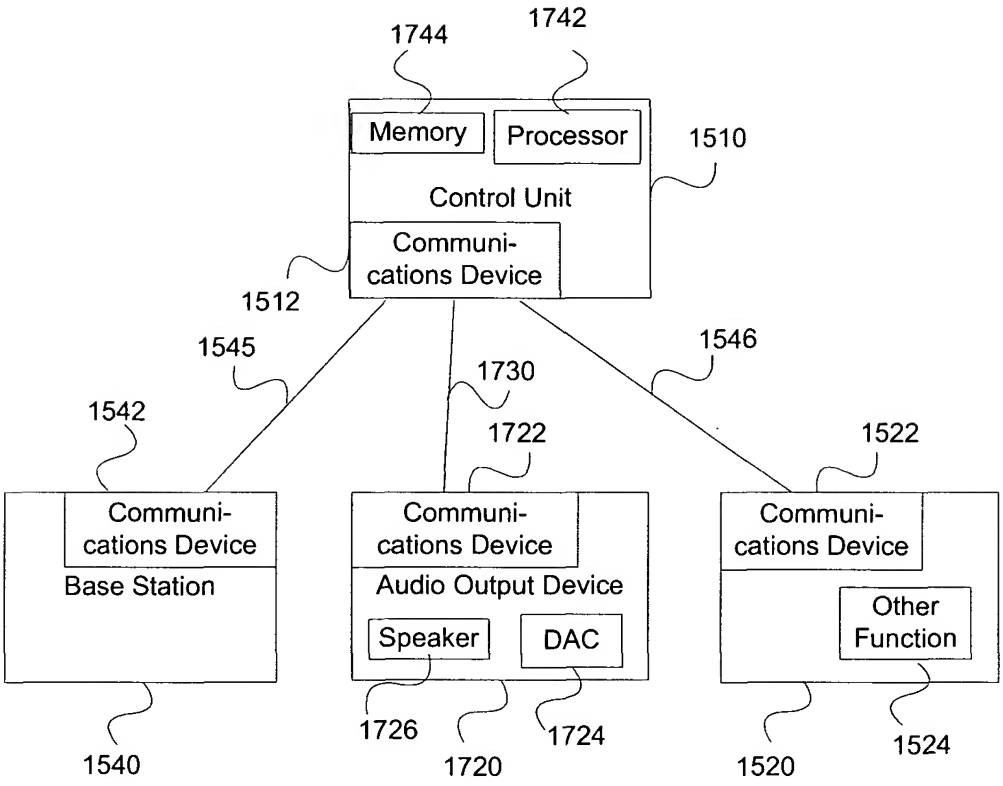

1560
Communications Network
1565
1552
Display
1540
Base Station
Communications Device
Communi-cations Device
1542
1555
1544
1545
1551
Modem
Personal Computer
1550
Commun-ications Device
1556
Printer
Keyboard
1554
1553
1510
1512
1547
Other Function
Wireless Communi-cations Device
1546
Control Unit
1514
1522
1532
1500
Other Function
WirelessCommuni-cations Device
Other Function
Wireless Communi-cations Device
1524
1520
1534
1530

FIG 16


Report information by component
1610
Receive information with control unit
1615
Send information to base station
1620
Send information to computer
1622
Send information over communications network (e.g., Internet)
1624
Store information
1630
Analyze information
1632
Use uploaded information to create information to download
1640

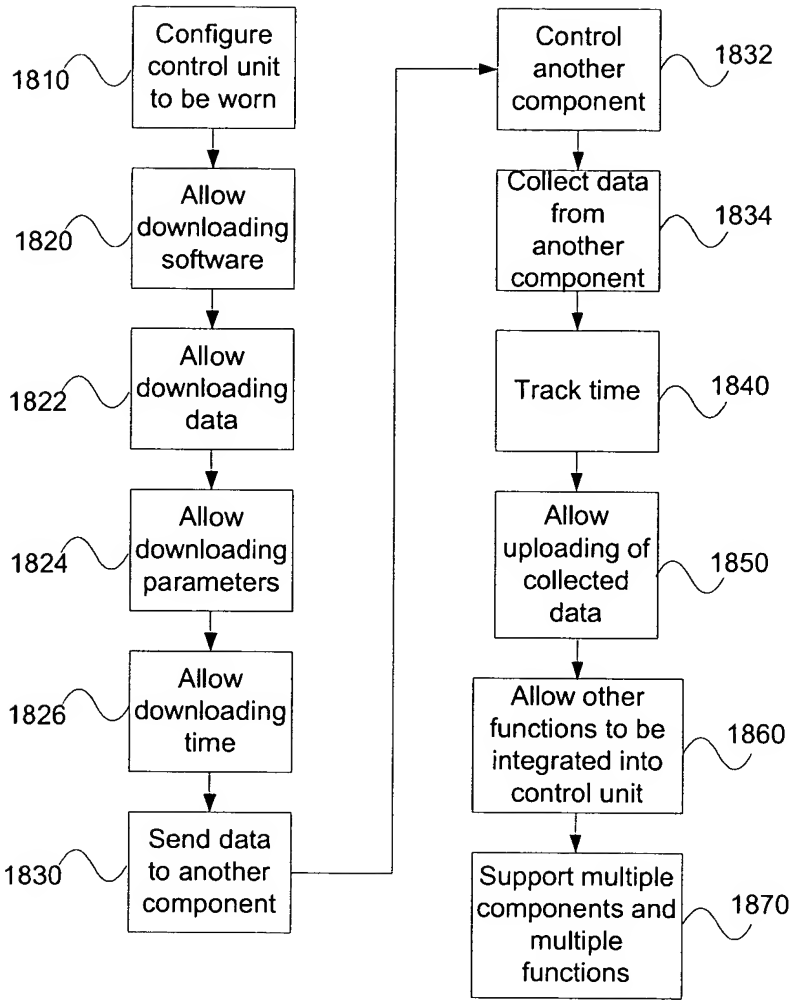
1600

FIG 17


1744
1742
Memory
Processor
1510
Control Unit
Communi-
cations Device
1512
1545
1546
1730
1542
1722
1522
Communi-
cations Device
Base Station
Communi-
cations Device
Audio Output Device
Speaker
DAC
Communi-
cations Device
Other
Function
1726
1720
1724
1540
1520
1524

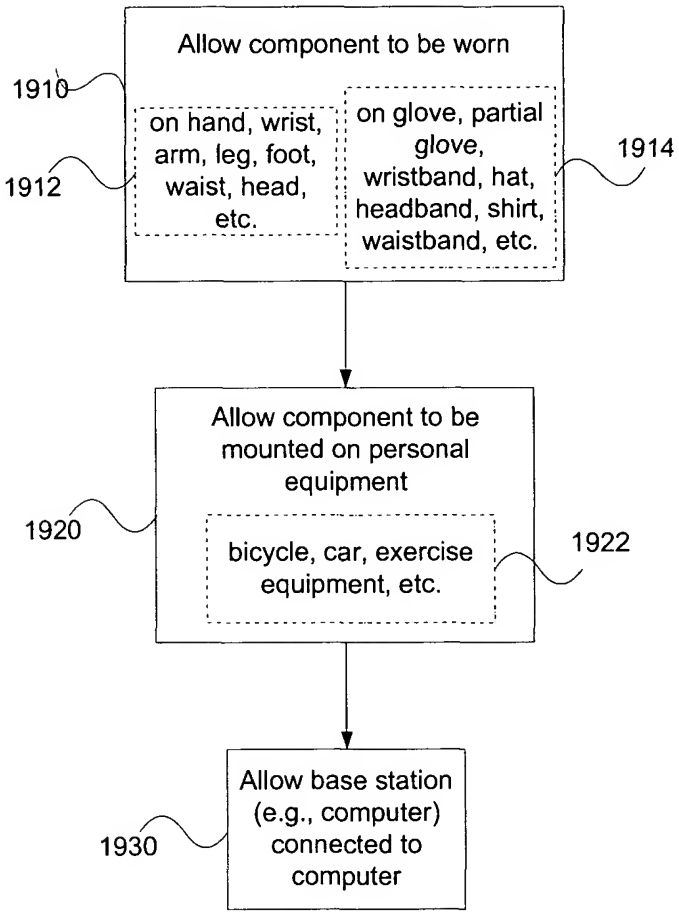
1700

FIG 18


Configure control unit to be worn
1810
Allow downloading software
1820
Allow downloading data
1822
Allow downloading parameters
1824
Allow downloading time
1826
Send data to another component
1830
Control another component
1832
Collect data from another component
1834
Track time
1840
Allow uploading of collected data
1850
Allow other functions to be integrated into control unit
1860
Support multiple components and multiple functions
1870

1800

FIG 19


Allow component to be worn
1910
on hand, wrist, arm, leg, foot, waist, head, etc.
1912
on glove, partial glove, wristband, hat, headband, shirt, waistband, etc.
1914
Allow component to be mounted on personal equipment
1920
bicycle, car, exercise equipment, etc.
1922
Allow base station (e.g., computer) connected to computer
1930

1900

FIG 20A

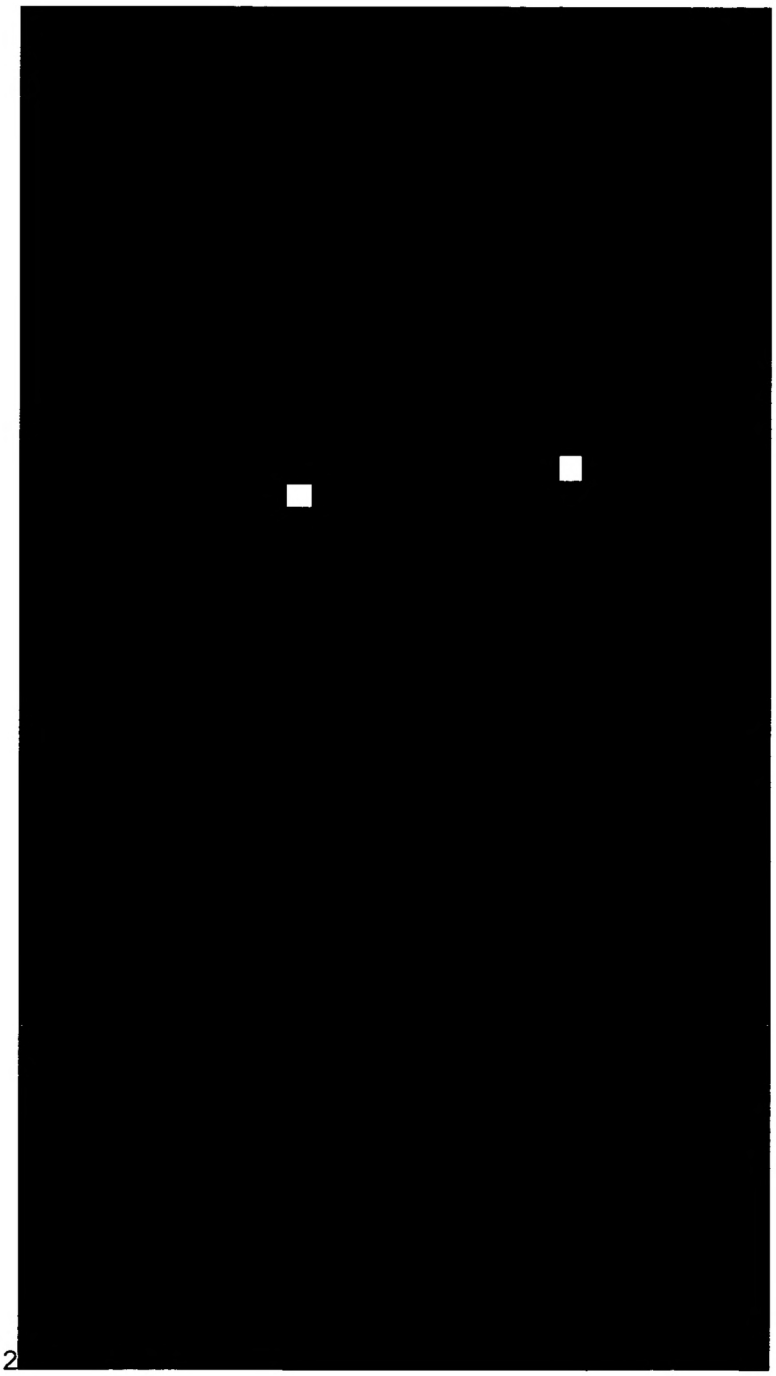


FIG 20B

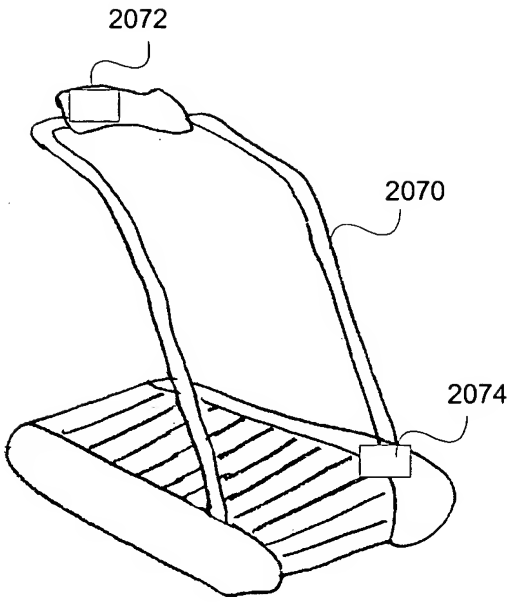


FIG 20C

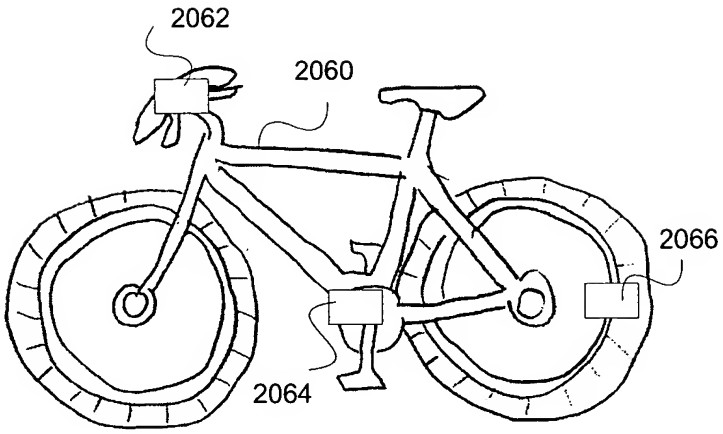
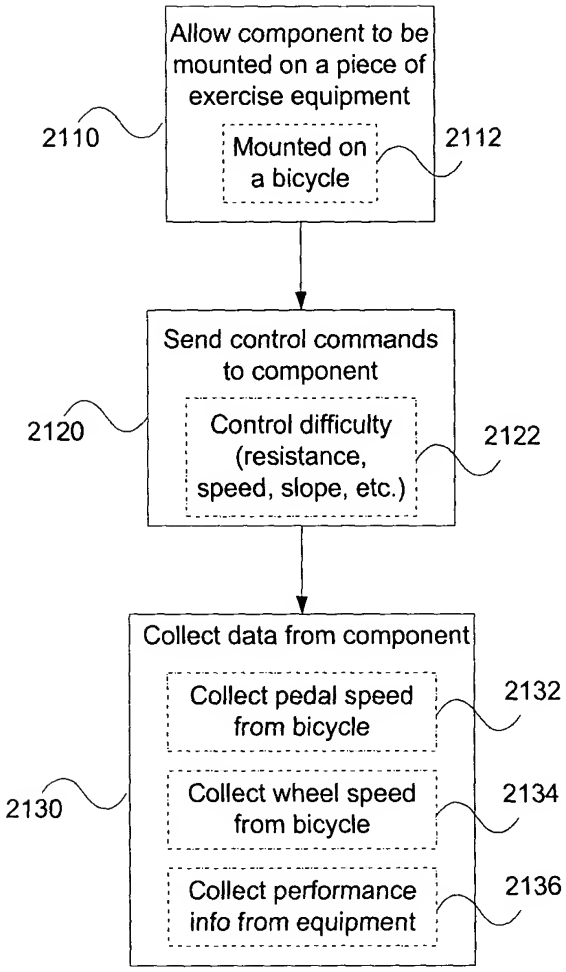


FIG 21


Allow component to be mounted on a piece of exercise equipment
2110
Mounted on a bicycle
2112
Send control commands to component
2120
Control difficulty (resistance, speed, slope, etc.)
2122
Collect data from component
2130
Collect pedal speed from bicycle
2132
Collect wheel speed from bicycle
2134
Collect performance info from equipment
2136

2100

FIG 22A

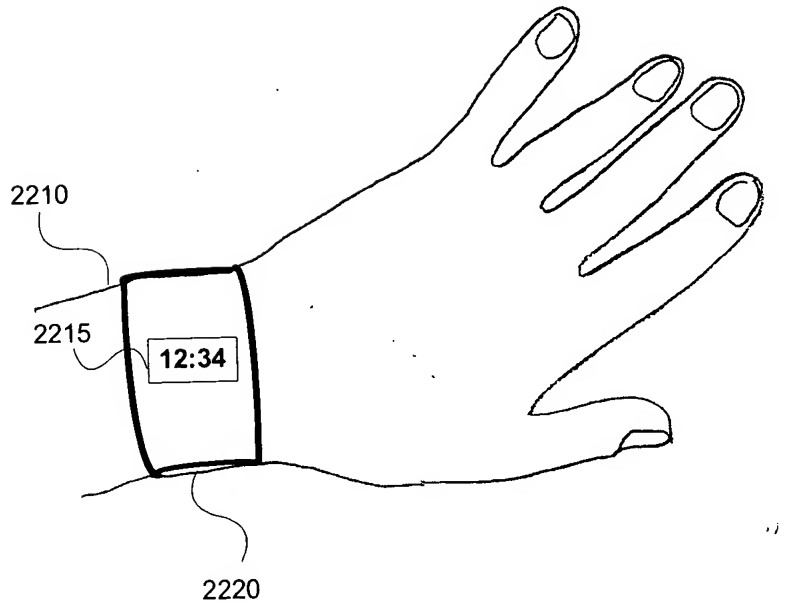


FIG 22B

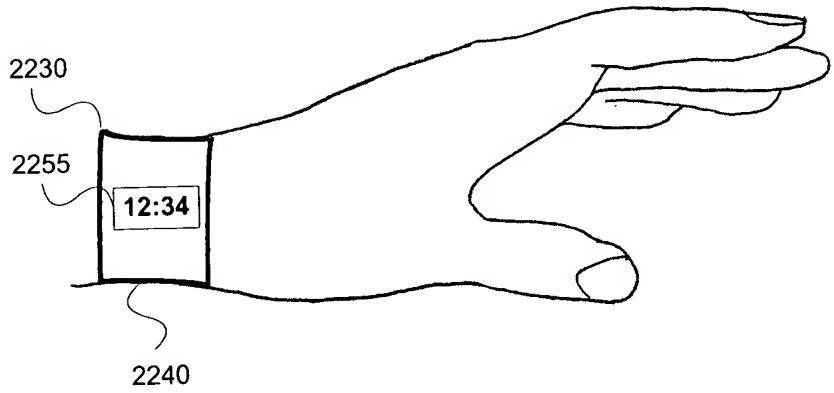


FIG 22C

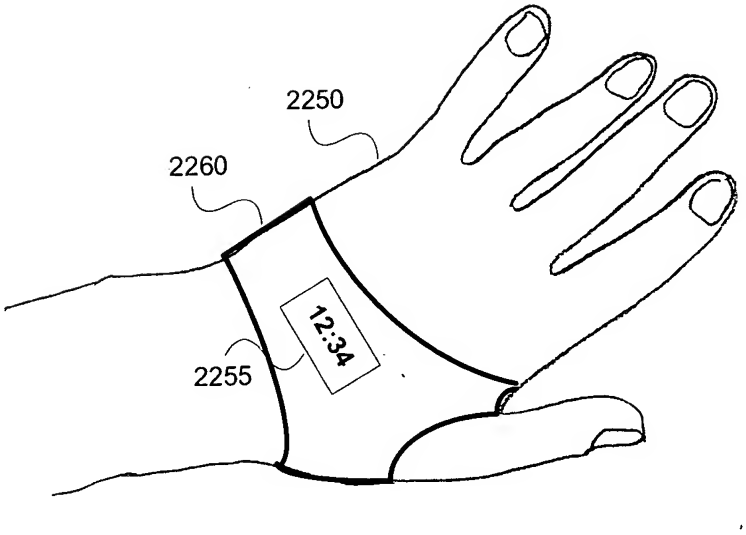


FIG 23A

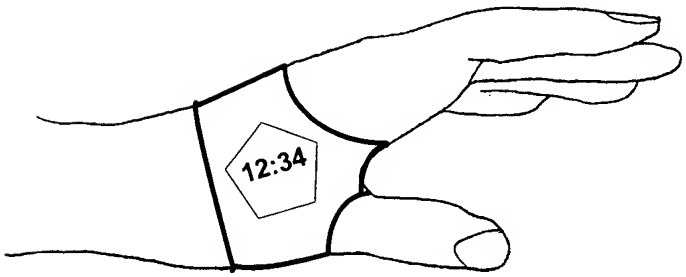


FIG 23B

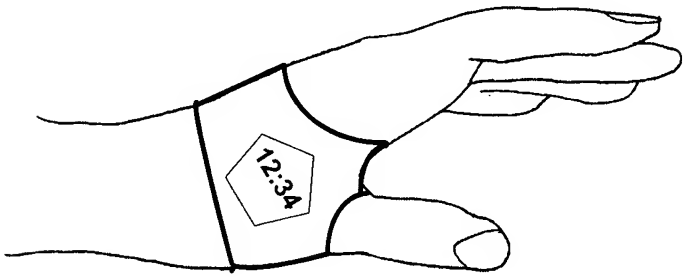


FIG 23C

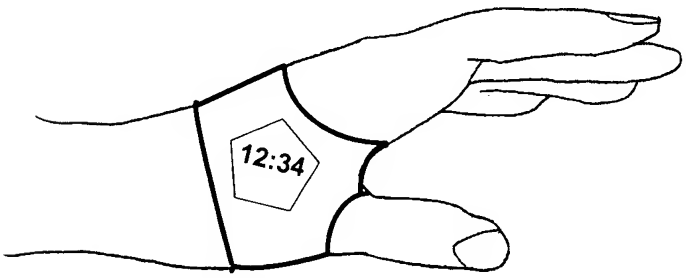


FIG 23D

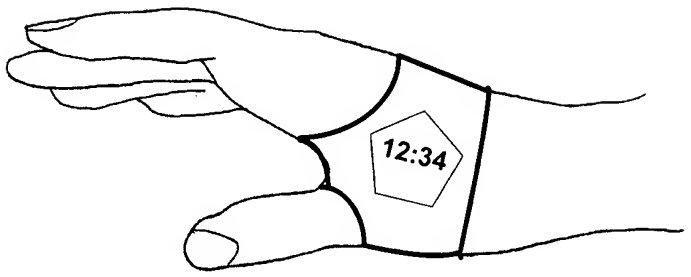


FIG 23E

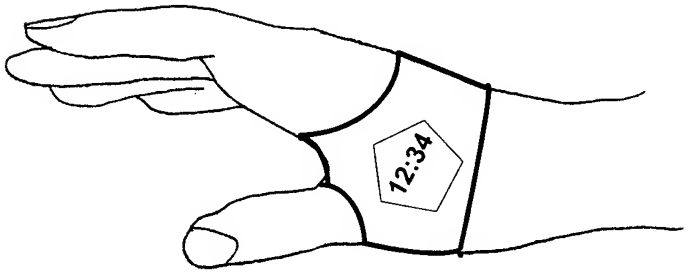


FIG 23F

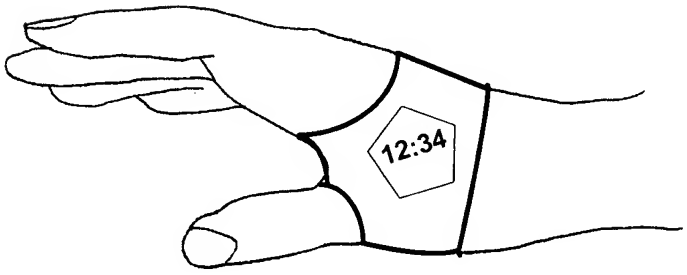
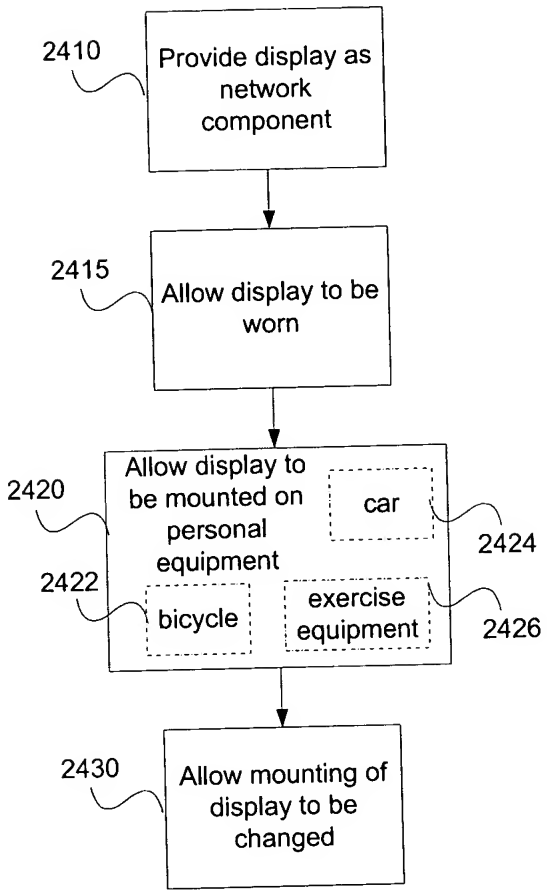
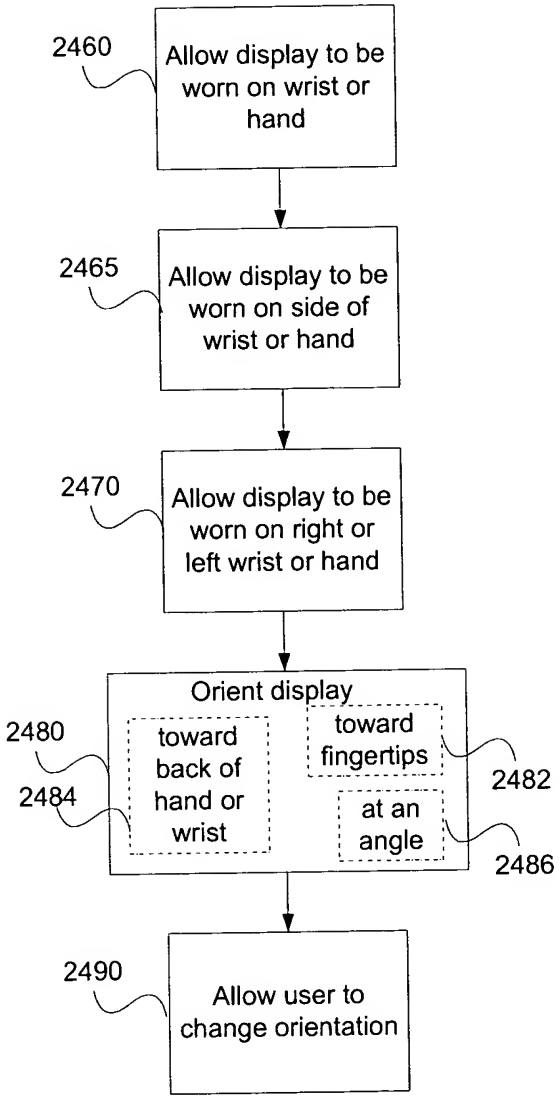


FIG 24A


2410
Provide display as network component
2415
Allow display to be worn
2420
Allow display to be mounted on personal equipment
car
2424
2422
bicycle
exercise equipment
2426
2430
Allow mounting of display to be changed

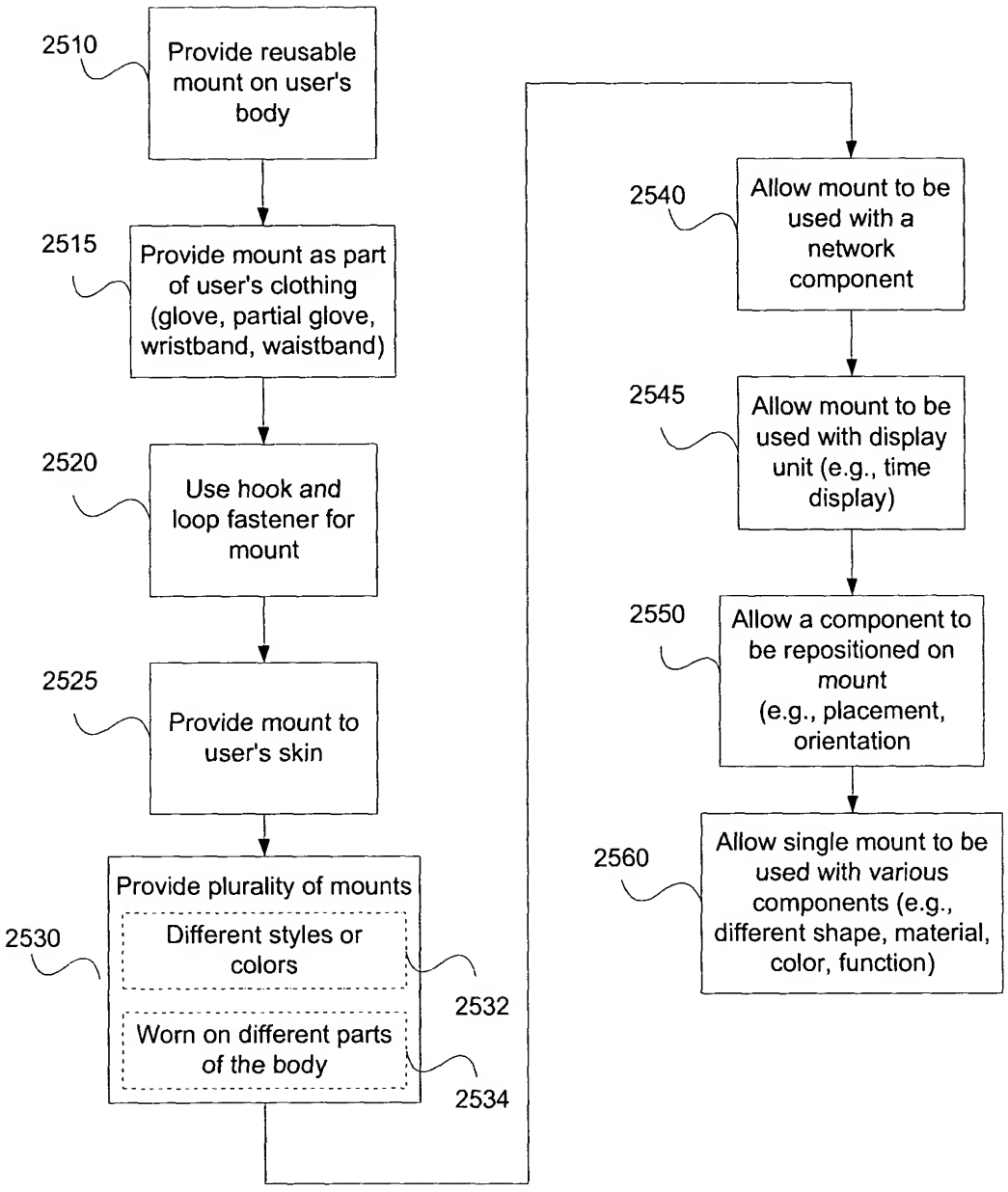
2400

FIG 24B


2460
Allow display to be worn on wrist or hand
2465
Allow display to be worn on side of wrist or hand
2470
Allow display to be worn on right or left wrist or hand
Orient display
2480
toward back of hand or wrist
2484
toward fingertips
2482
at an angle
2486
2490
Allow user to change orientation

2415

FIG 25


2510
Provide reusable mount on user's body
2515
Provide mount as part of user's clothing (glove, partial glove, wristband, waistband)
2520
Use hook and loop fastener for mount
2525
Provide mount to user's skin
Provide plurality of mounts
2530
Different styles or colors
2532
Worn on different parts of the body
2534
2540
Allow mount to be used with a network component
2545
Allow mount to be used with display unit (e.g., time display)
2550
Allow a component to be repositioned on mount (e.g., placement, orientation
2560
Allow single mount to be used with various components (e.g., different shape, material, color, function)

2500

FIG 26A

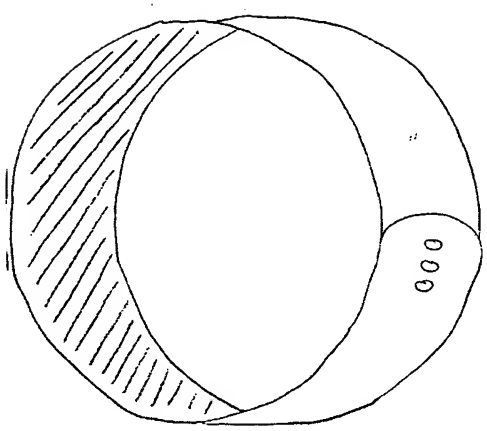


FIG 26B

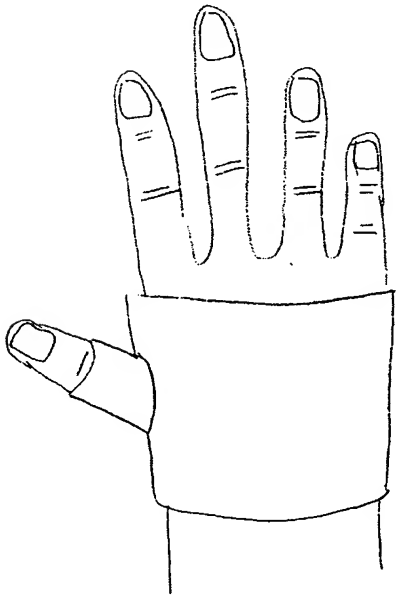


FIG 26C

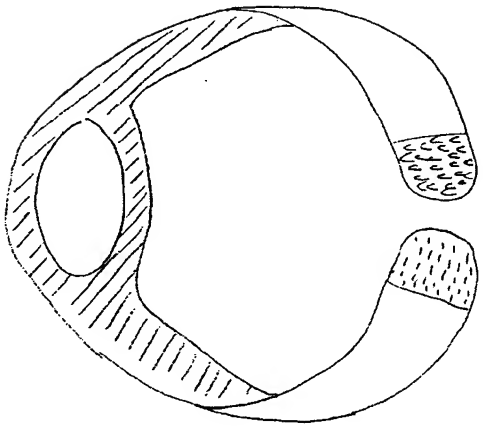


FIG 27A

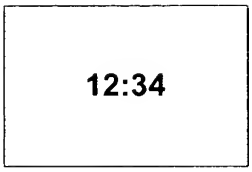


FIG 27B

FIG 27C

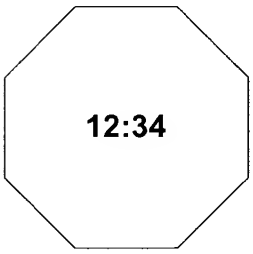


FIG 27D

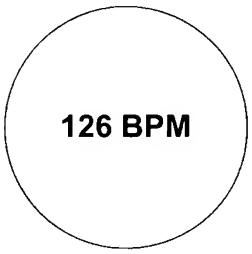


FIG 28A

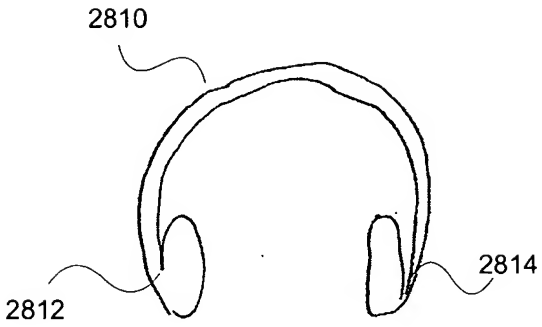


Fig 28B

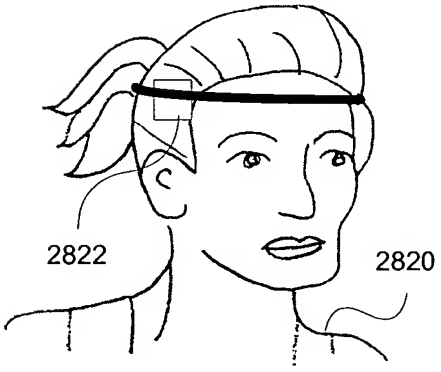


FIG 28C

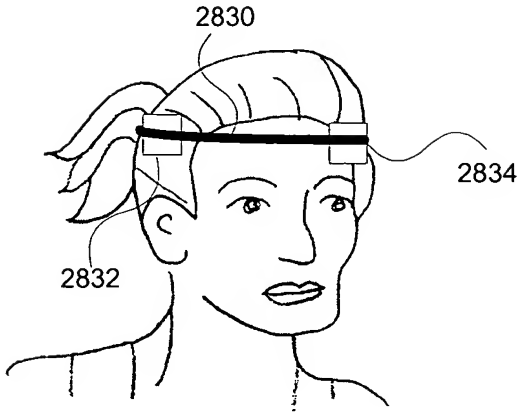


FIG 28D

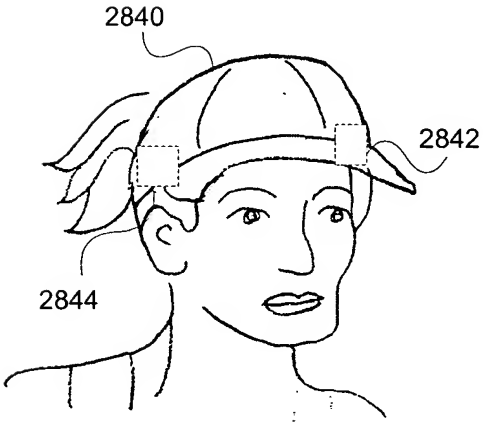
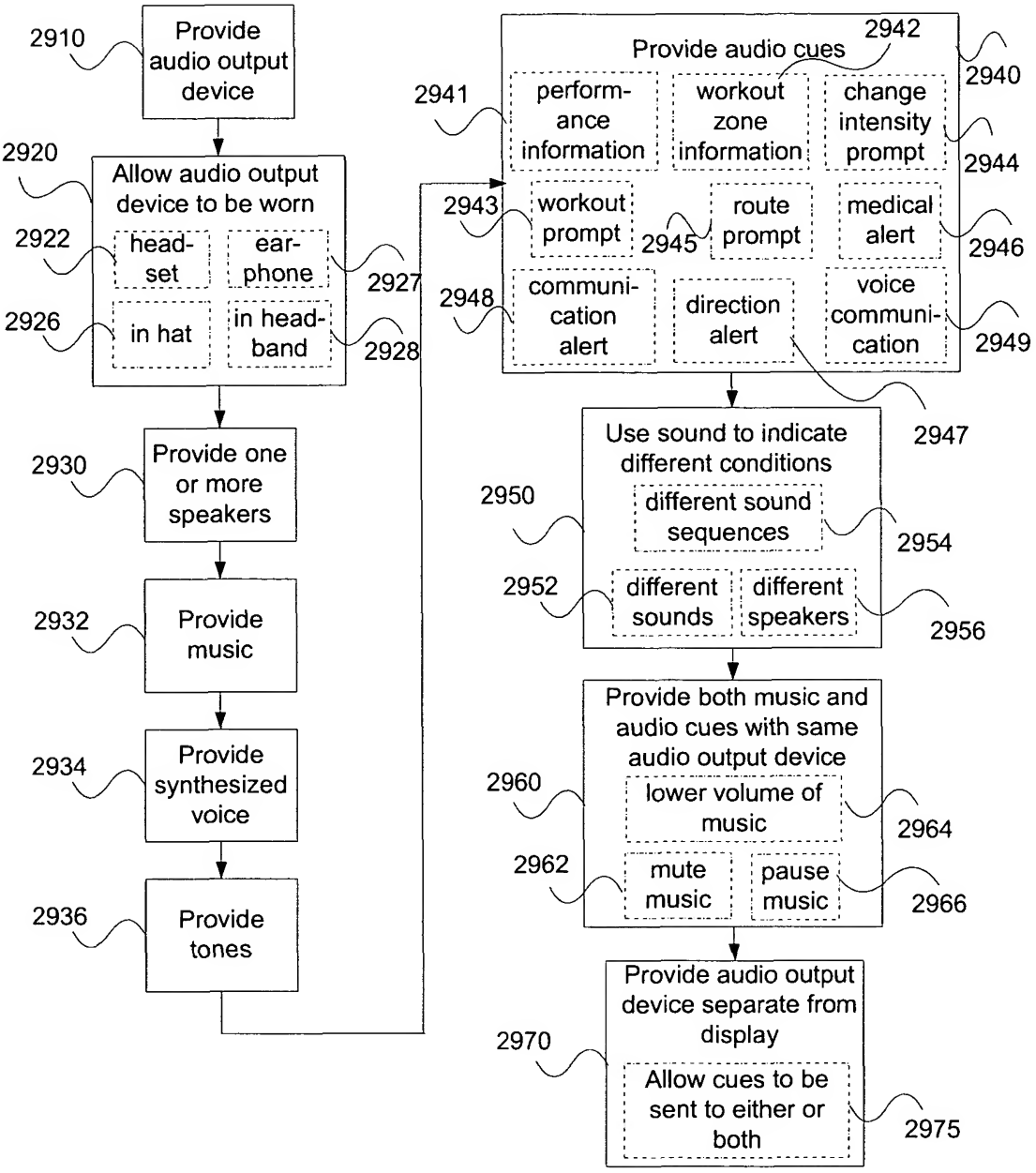
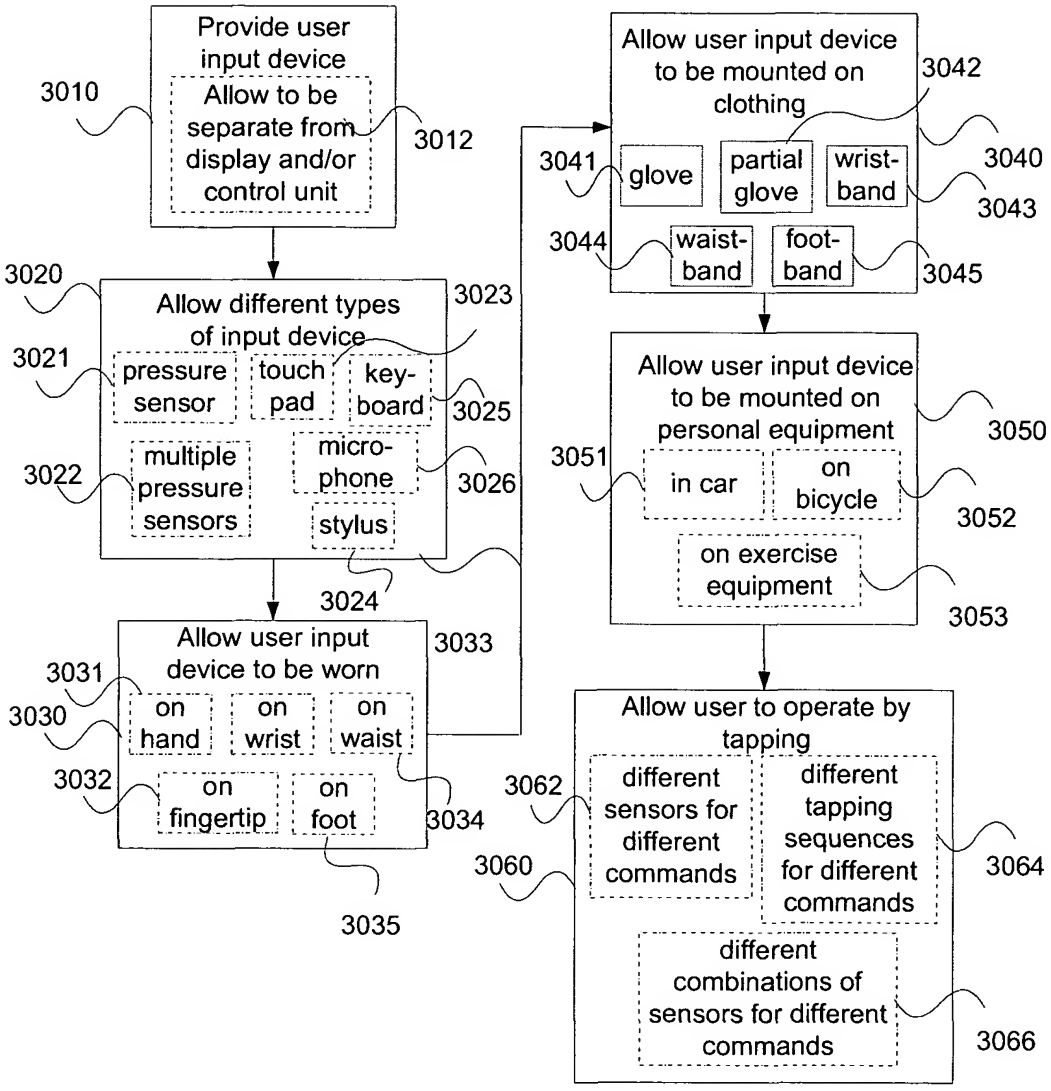


FIG 29


2910
Provide audio output device
2920
Allow audio output device to be worn
2922
head-set
ear-phone
2927
2926
in hat
in head-band
2928
2930
Provide one or more speakers
2932
Provide music
2934
Provide synthesized voice
2936
Provide tones
Provide audio cues
2942
2940
2941
perform-ance information
workout zone information
change intensity prompt
2944
2943
workout prompt
2945
route prompt
medical alert
2946
2948
communi-cation alert
direction alert
voice communi-cation
2949
2947
Use sound to indicate different conditions
2950
different sound sequences
2954
2952
different sounds
different speakers
2956
Provide both music and audio cues with same audio output device
2960
lower volume of music
2964
2962
mute music
pause music
2966
Provide audio output device separate from display
2970
Allow cues to be sent to either or both
2975

2900

FIG 30


Provide user input device
Allow to be separate from display and/or control unit
3010
3012
Allow different types of input device
3020
3023
pressure sensor
touch pad
key-board
3021
3025
multiple pressure sensors
micro-phone
stylus
3022
3026
3024
Allow user input device to be worn
3033
3031
on hand
on wrist
on waist
3030
3032
on fingertip
on foot
3034
3035
Allow user input device to be mounted on clothing
3042
3041
glove
partial glove
wrist-band
3040
3043
3044
waist-band
foot-band
3045
Allow user input device to be mounted on personal equipment
3050
3051
in car
on bicycle
3052
on exercise equipment
3053
Allow user to operate by tapping
3062
different sensors for different commands
different tapping sequences for different commands
3064
3060
different combinations of sensors for different commands
3066

3000

FIG 31A

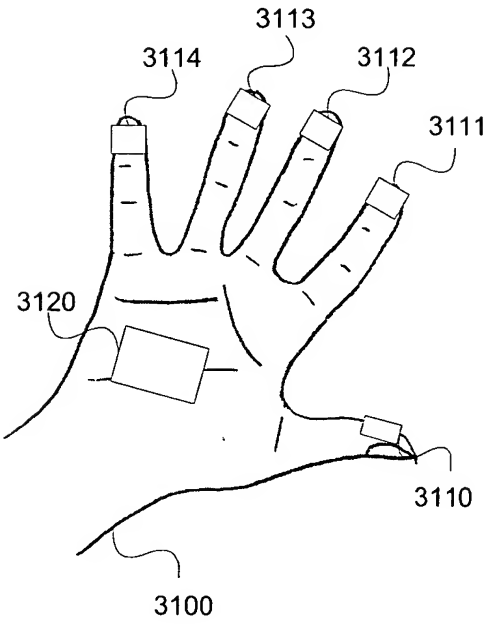


FIG 31B

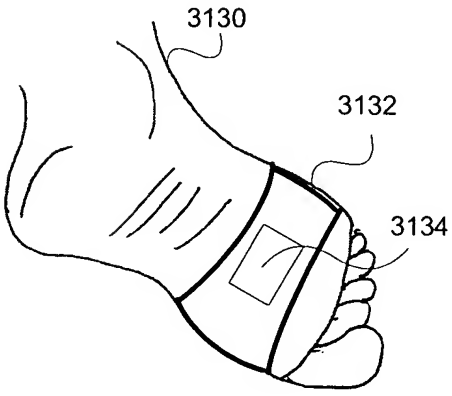


FIG 31C

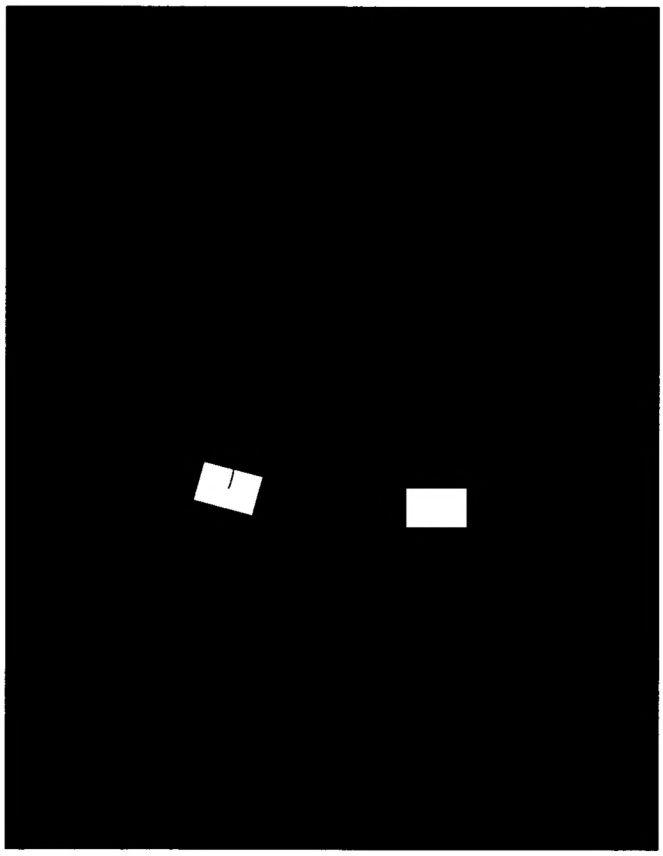
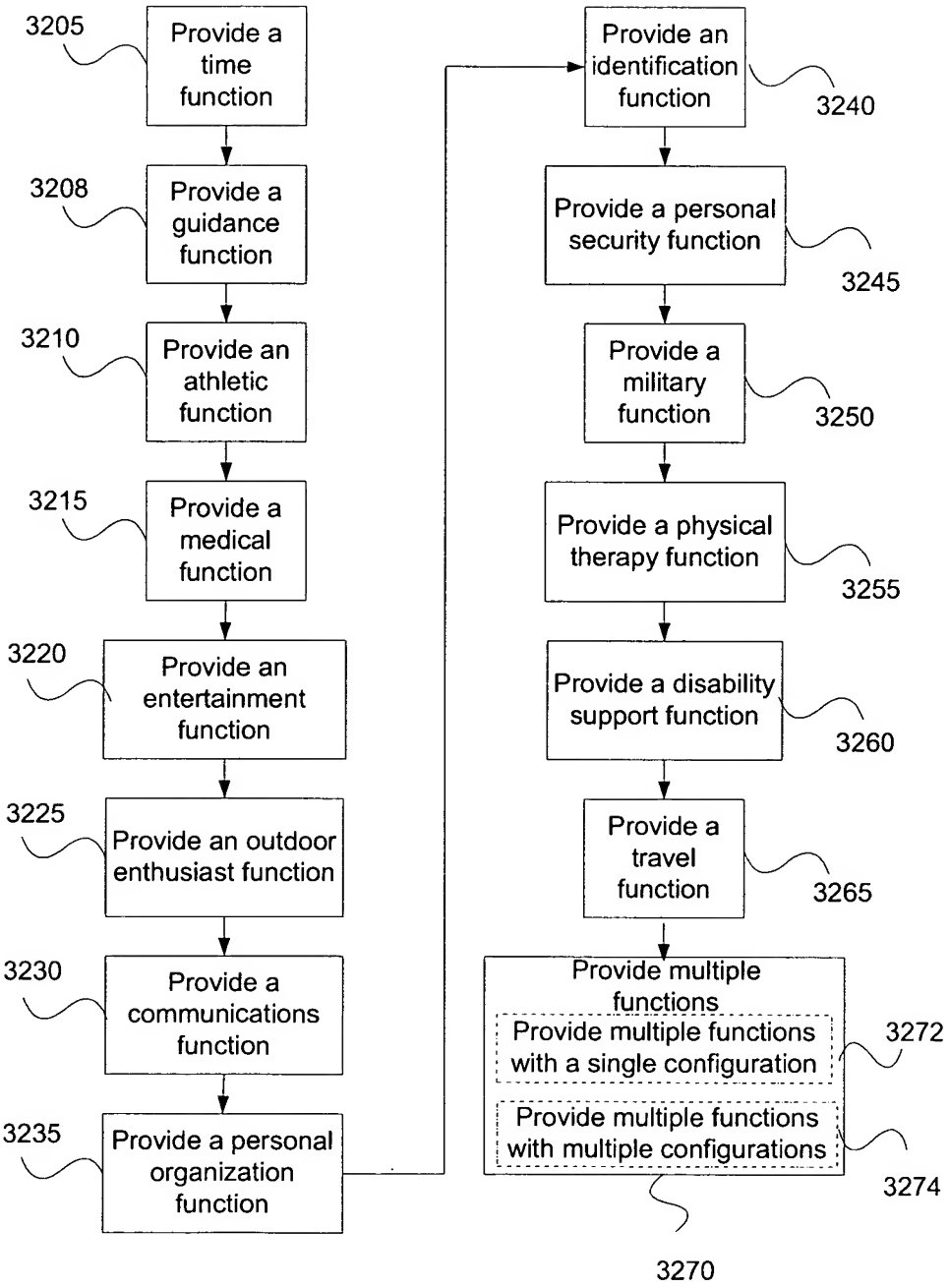
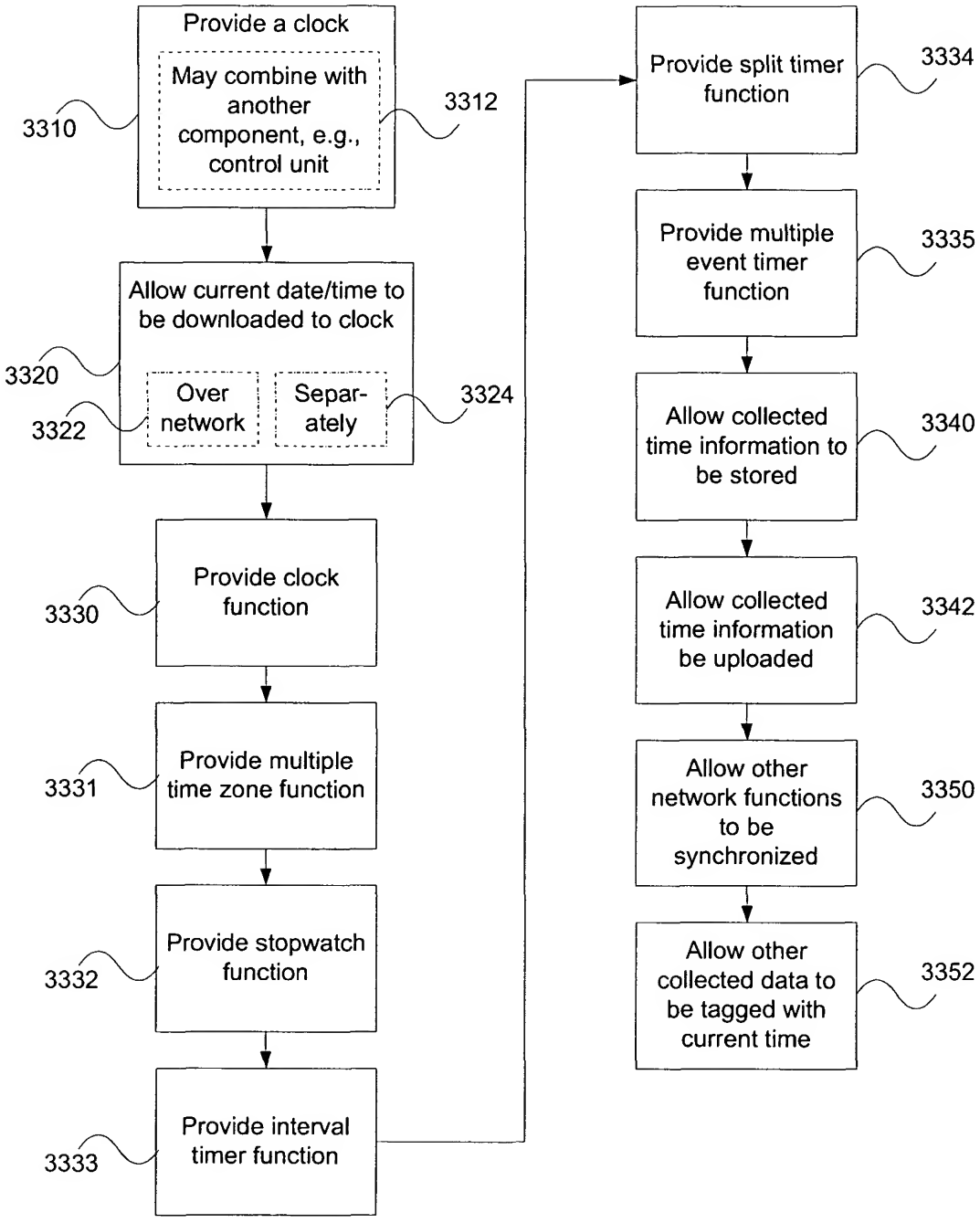


FIG 32


3205
Provide a time function
3208
Provide a guidance function
3210
Provide an athletic function
3215
Provide a medical function
3220
Provide an entertainment function
3225
Provide an outdoor enthusiast function
3230
Provide a communications function
3235
Provide a personal organization function
Provide an identification function
3240
Provide a personal security function
3245
Provide a military function
3250
Provide a physical therapy function
3255
Provide a disability support function
3260
Provide a travel function
3265
Provide multiple functions
Provide multiple functions with a single configuration
3272
Provide multiple functions with multiple configurations
3274
3270

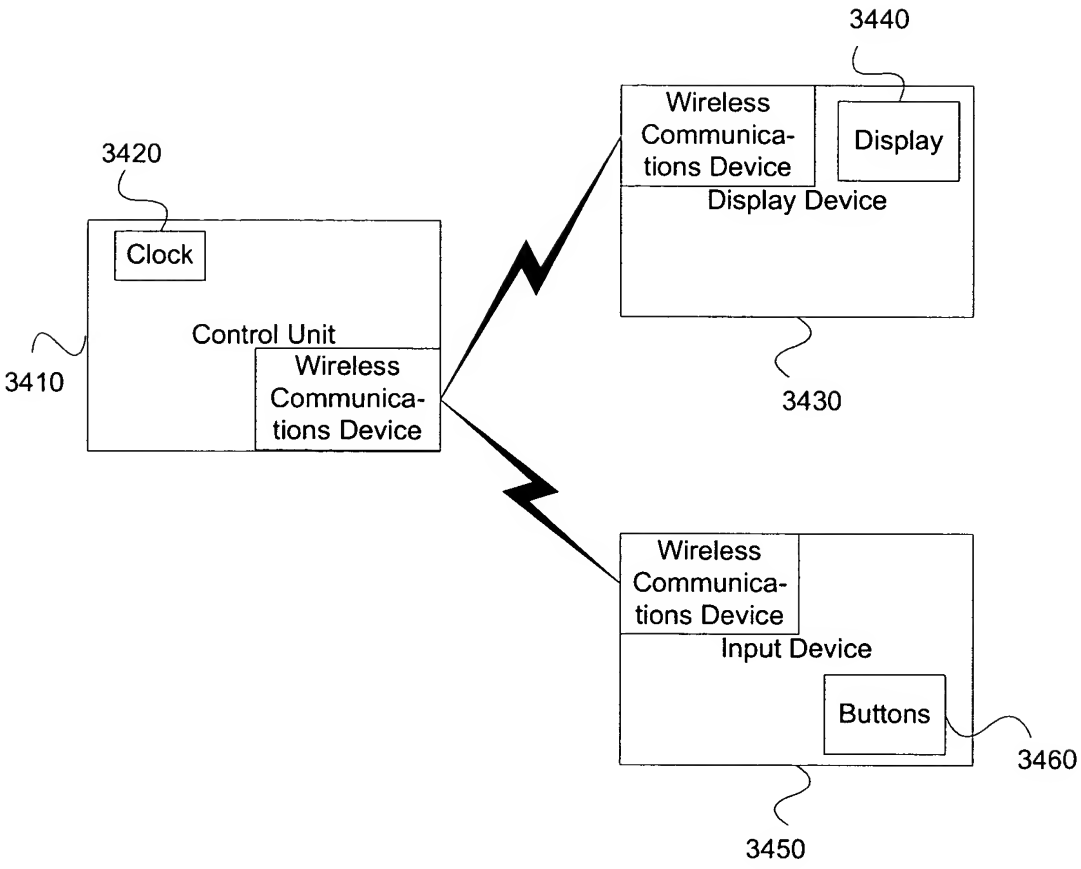
3200

FIG 33


Provide a clock
May combine with another component, e.g., control unit
3310
3312
Allow current date/time to be downloaded to clock
3320
Over network
3322
Separ-ately
3324
Provide clock function
3330
Provide multiple time zone function
3331
Provide stopwatch function
3332
Provide interval timer function
3333
Provide split timer function
3334
Provide multiple event timer function
3335
Allow collected time information to be stored
3340
Allow collected time information be uploaded
3342
Allow other network functions to be synchronized
3350
Allow other collected data to be tagged with current time
3352

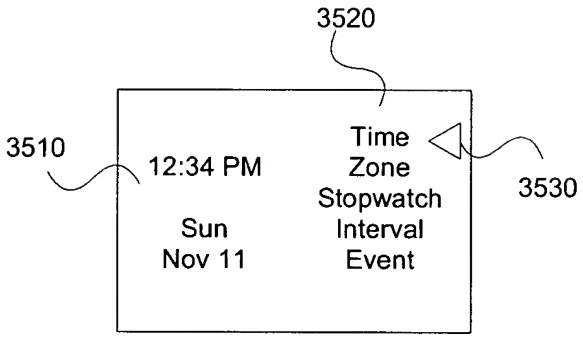
3205

FIG 34


3440
Wireless Communica-tions Device
Display
Display Device
3420
Clock
Control Unit
3410
Wireless Communica-tions Device
3430
Wireless Communica-tions Device
Input Device
Buttons
3460
3450

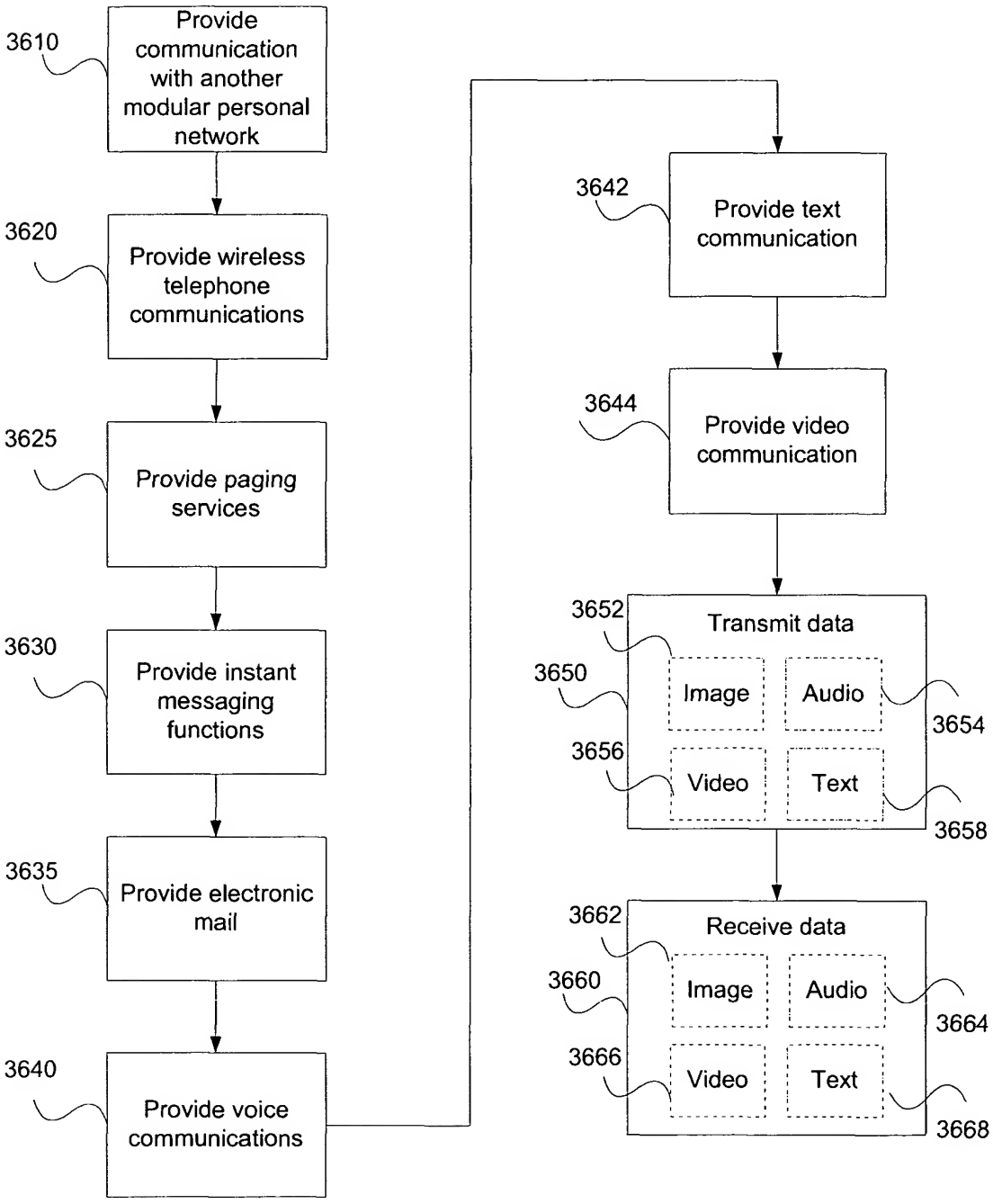
3400

FIG 35


3520
3510
12:34 PM
Sun
Nov 11
Time
Zone
Stopwatch
Interval
Event
3530

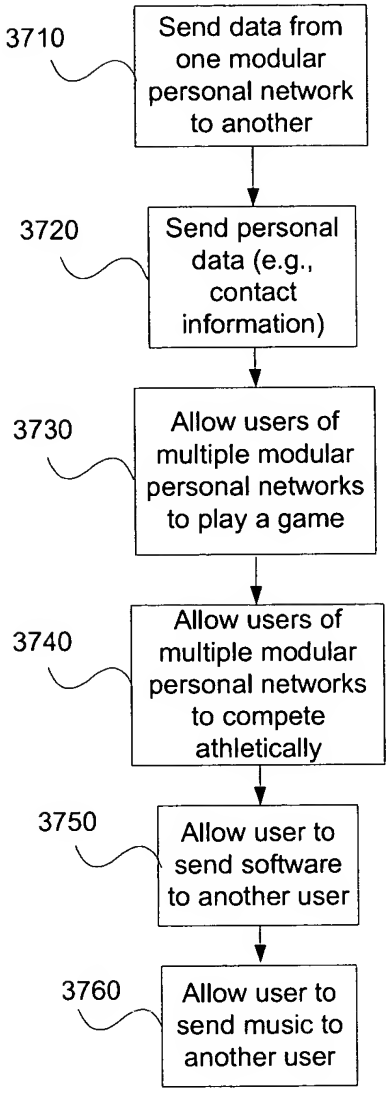
3500

FIG 36


3610
Provide communication with another modular personal network
3620
Provide wireless telephone communications
3625
Provide paging services
3630
Provide instant messaging functions
3635
Provide electronic mail
3640
Provide voice communications
3642
Provide text communication
3644
Provide video communication
3652
Transmit data
3650
Image
Audio
3654
3656
Video
Text
3658
3662
Receive data
3660
Image
Audio
3664
3666
Video
Text
3668

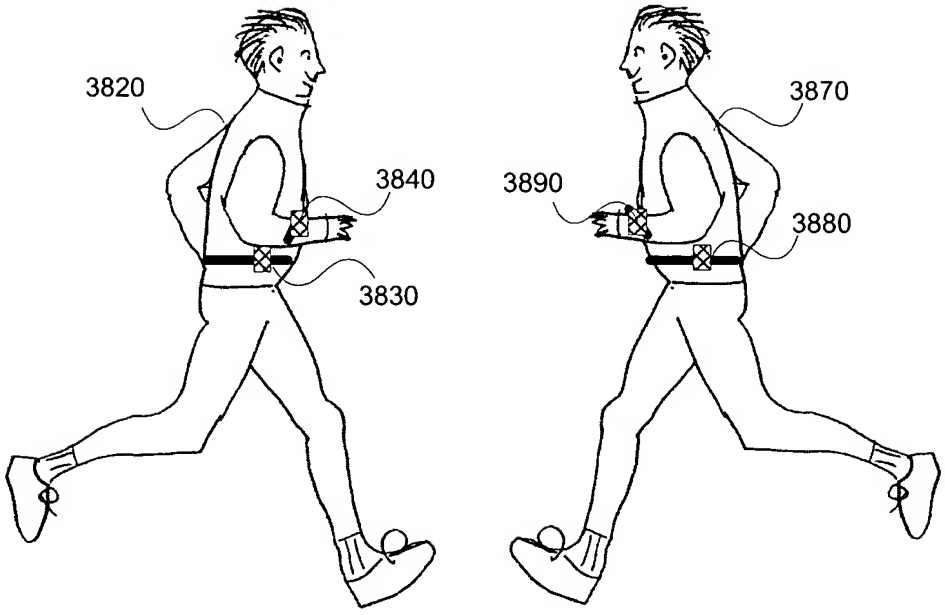
3230

FIG 37


3710
Send data from one modular personal network to another
3720
Send personal data (e.g., contact information)
3730
Allow users of multiple modular personal networks to play a game
3740
Allow users of multiple modular personal networks to compete athletically
3750
Allow user to send software to another user
3760
Allow user to send music to another user

3700

FIG 38



3810 **3860**

FIG 39

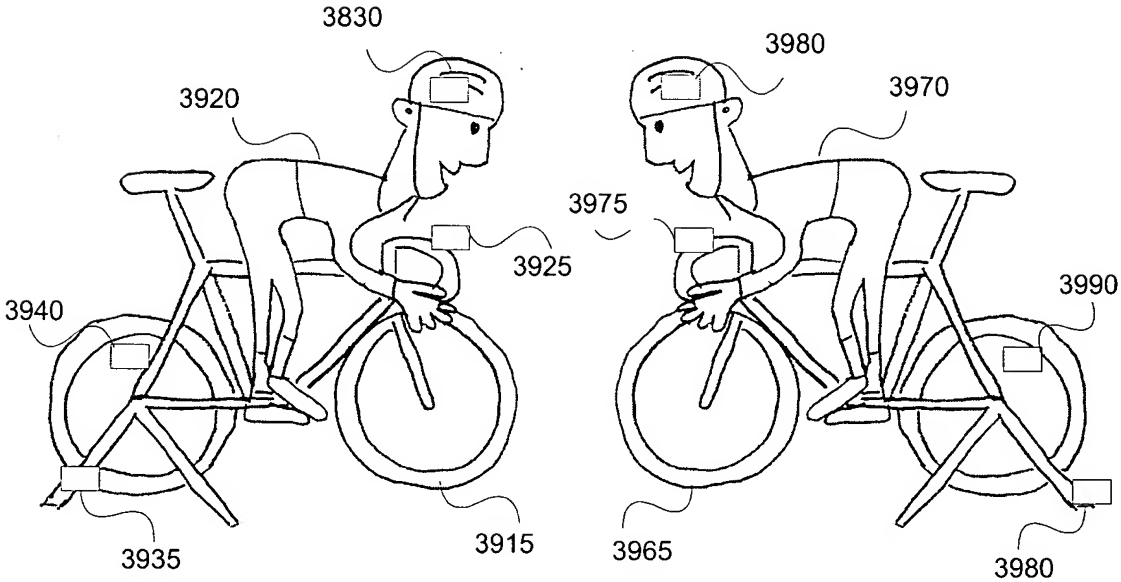
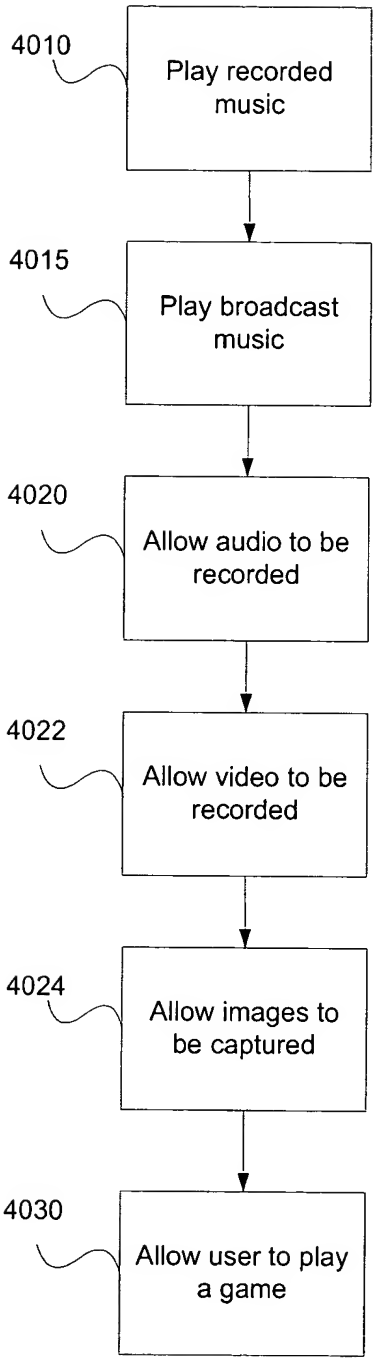
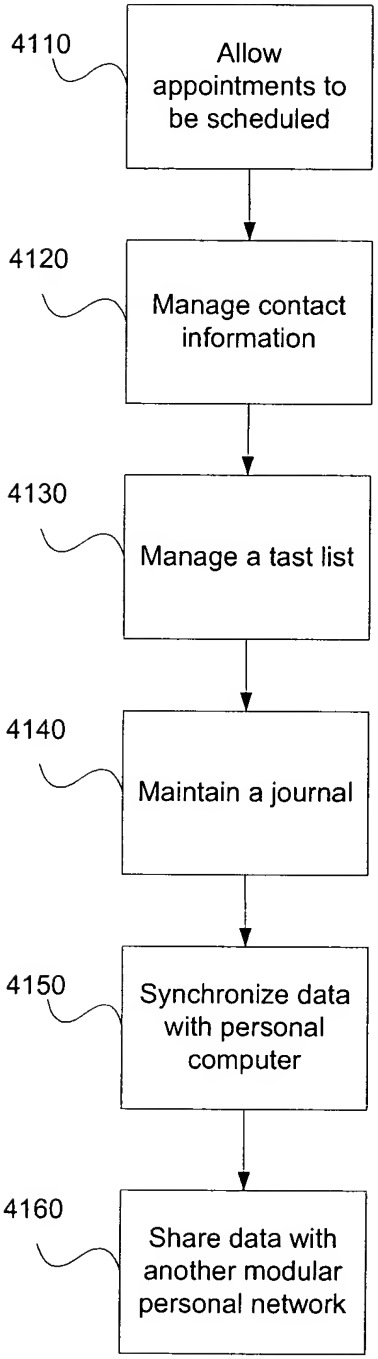

3830
3920
3925
3940
3935
3915
3910
3980
3970
3975
3990
3965
3980
3960

FIG 40



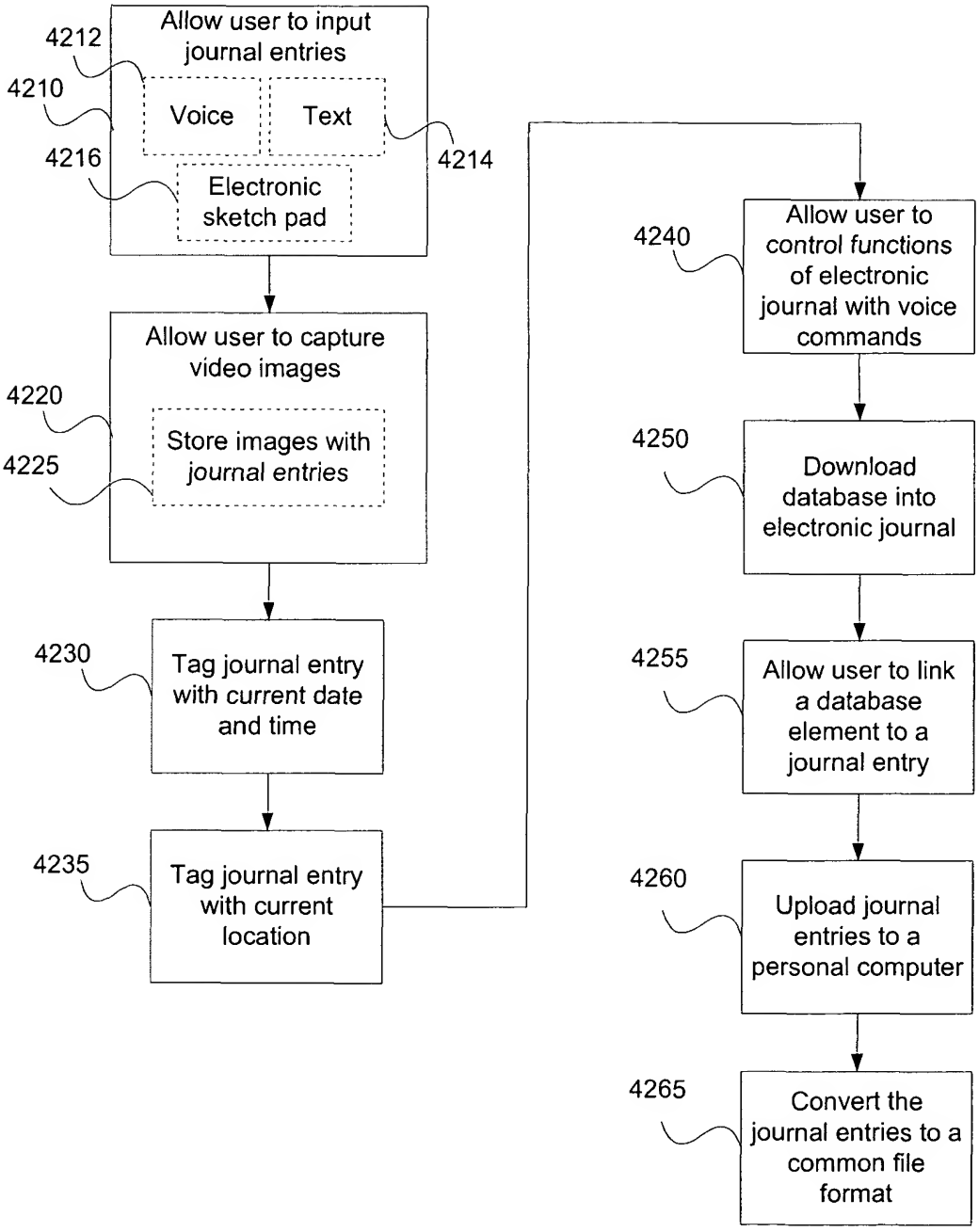
3220

FIG 41



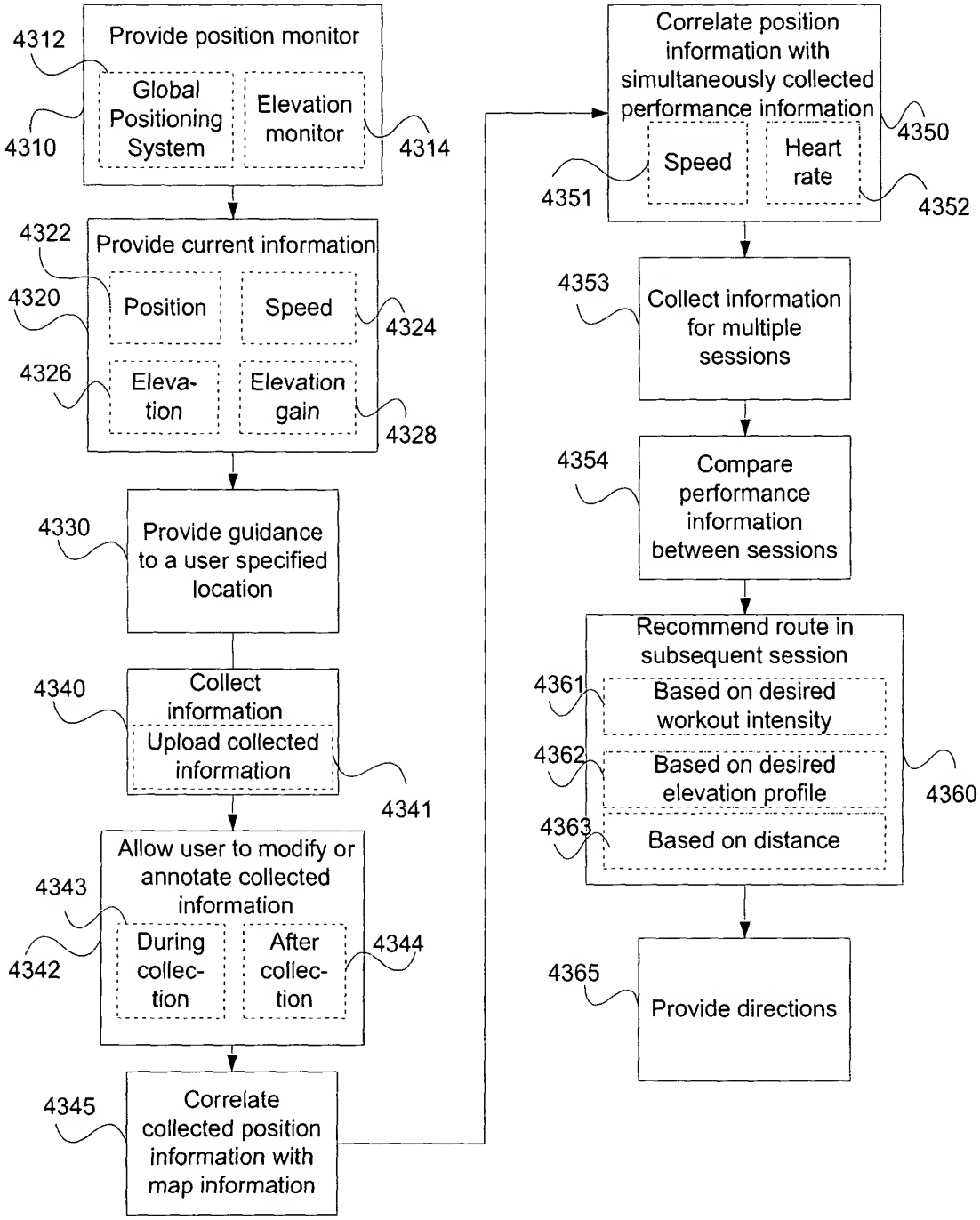
3235

FIG 42


Allow user to input journal entries
4212
4210
Voice
Text
4214
4216
Electronic sketch pad
Allow user to capture video images
4220
Store images with journal entries
4225
4230
Tag journal entry with current date and time
4235
Tag journal entry with current location
4240
Allow user to control functions of electronic journal with voice commands
4250
Download database into electronic journal
4255
Allow user to link a database element to a journal entry
4260
Upload journal entries to a personal computer
4265
Convert the journal entries to a common file format

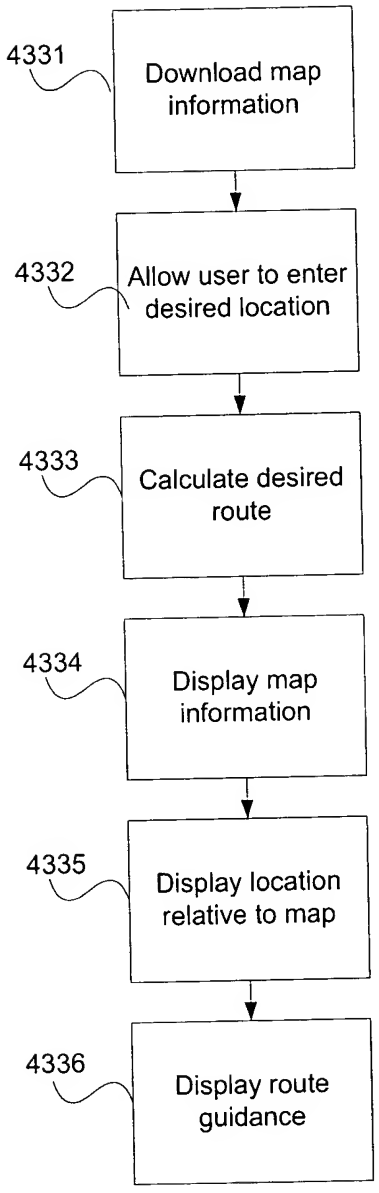
4140

FIG 43A


4312
Provide position monitor
Global Positioning System
Elevation monitor
4310
4314
4322
Provide current information
Position
Speed
4320
4324
4326
Eleva-tion
Elevation gain
4328
4330
Provide guidance to a user specified location
4340
Collect information
Upload collected information
4341
Allow user to modify or annotate collected information
4343
During collec-tion
After collec-tion
4342
4344
4345
Correlate collected position information with map information
Correlate position information with simultaneously collected performance information
4350
Speed
Heart rate
4351
4352
4353
Collect information for multiple sessions
4354
Compare performance information between sessions
Recommend route in subsequent session
4361
Based on desired workout intensity
4362
Based on desired elevation profile
4360
4363
Based on distance
4365
Provide directions

3208

FIG 43B


4331
Download map information
4332
Allow user to enter desired location
4333
Calculate desired route
4334
Display map information
4335
Display location relative to map
4336
Display route guidance

4330

FIG 44

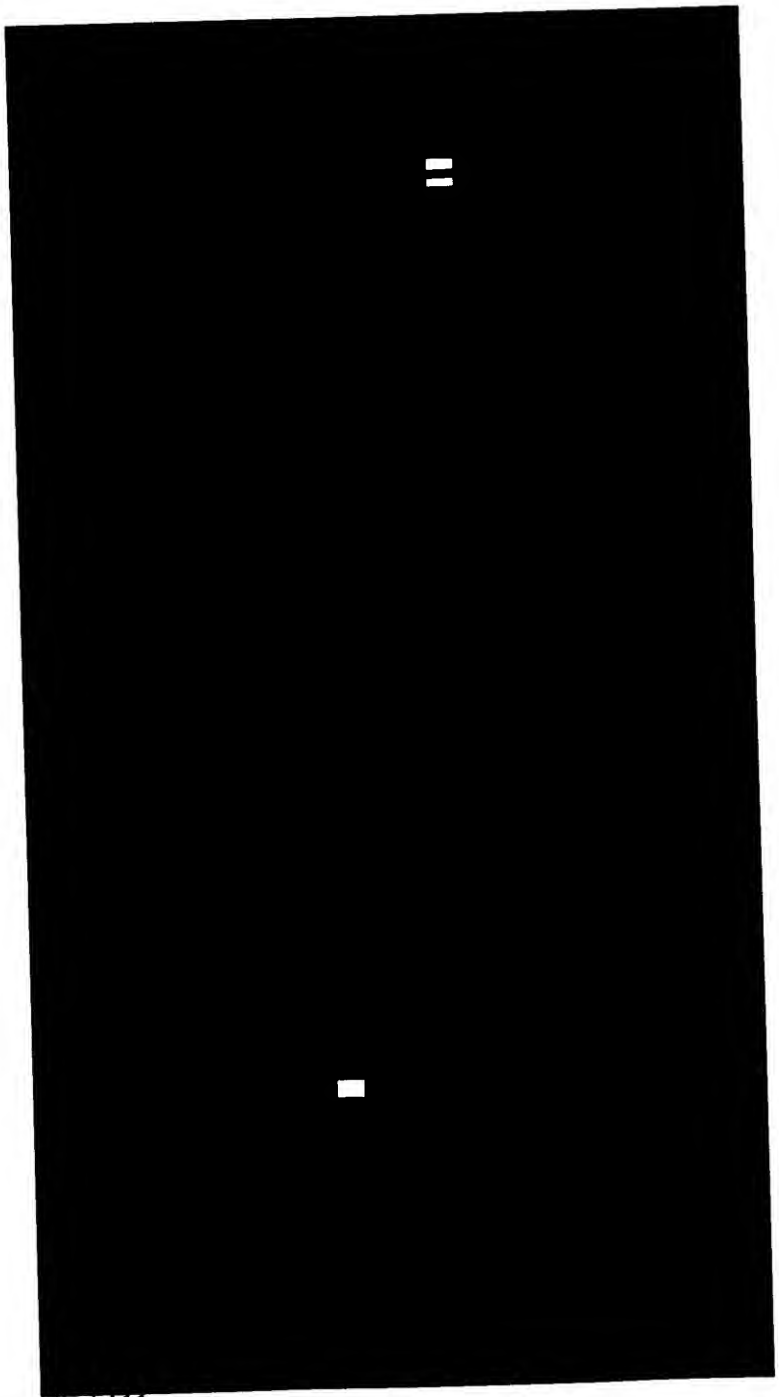


FIG 45A

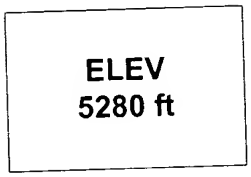


FIG 45B

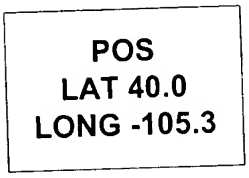


FIG 45C

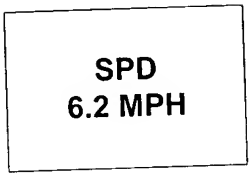


FIG 45D

FIG 45E

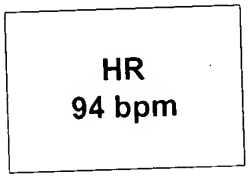


FIG 45F

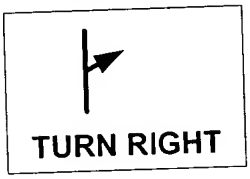


FIG 45G

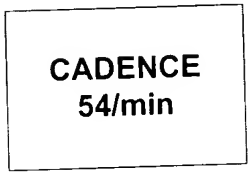


FIG 45H

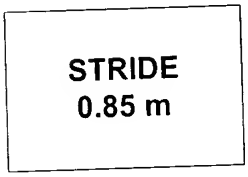


FIG 45I

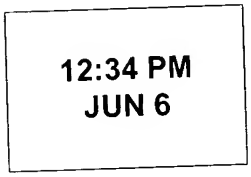


FIG 45J

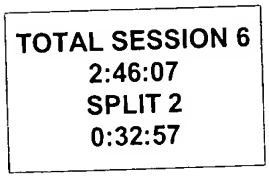


FIG 45K

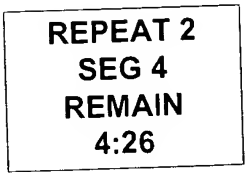


FIG 45L

FIG 46

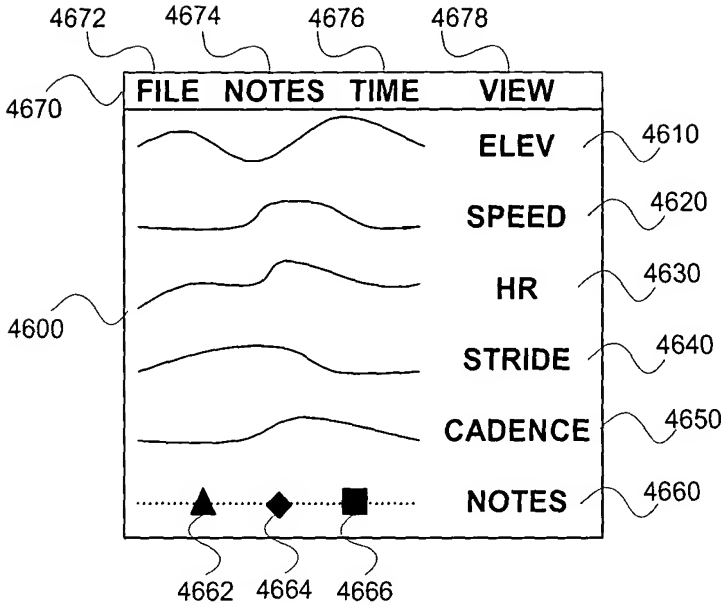

4672
4674
4676
4678
4670
FILE NOTES TIME VIEW
ELEV
4610
SPEED
4620
HR
4630
4600
STRIDE
4640
CADENCE
4650
NOTES
4660
4662 4664 4666

FIG 47

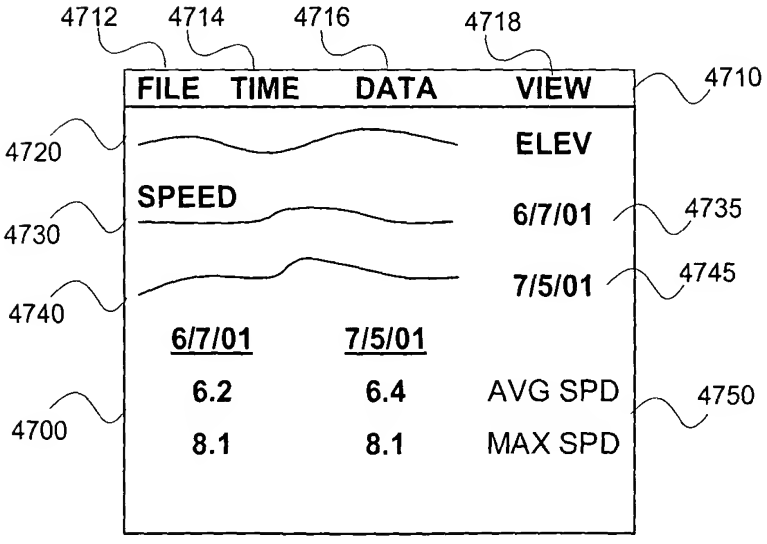

4712
4714
4716
4718
FILE TIME DATA VIEW
4710
4720
ELEV
SPEED
4730
6/7/01
4735
4740
7/5/01
4745
6/7/01 7/5/01
6.2 6.4 AVG SPD
4700
4750
8.1 8.1 MAX SPD

FIG 48

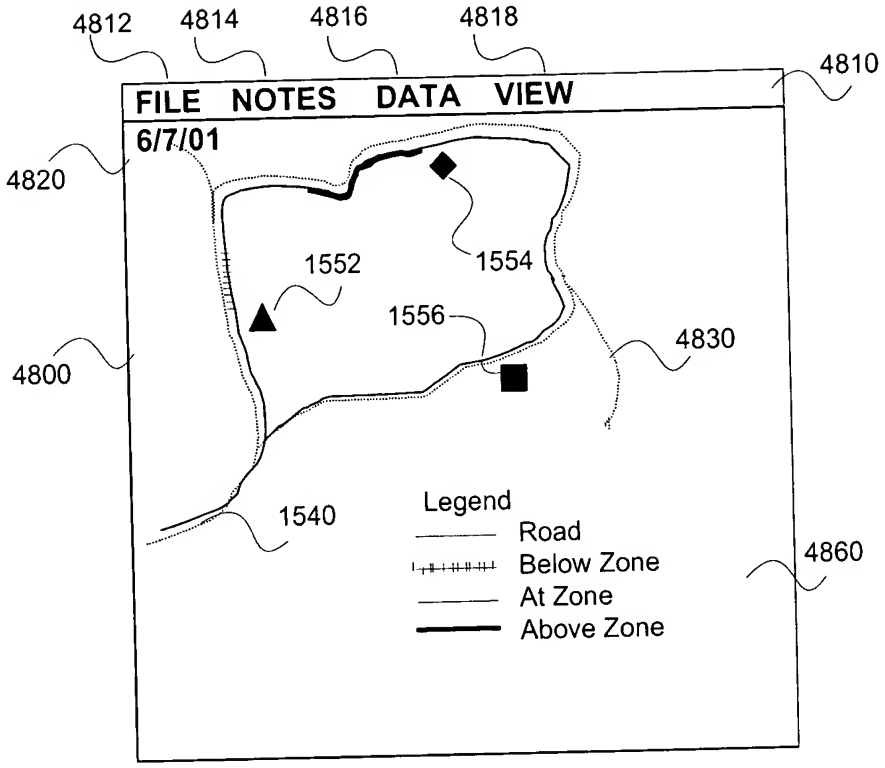

4812
4814
4816
4818
4810
FILE NOTES DATA VIEW
6/7/01
4820
1552
1554
1556
4830
4800
1540
Legend
Road
Below Zone
At Zone
Above Zone
4860

FIG 49

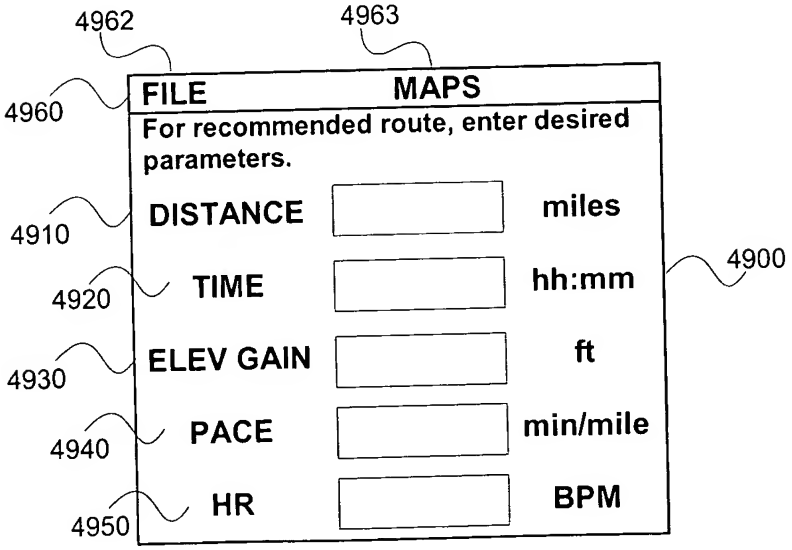

4962
4963
4960
FILE MAPS
For recommended route, enter desired parameters.
4910
DISTANCE
miles
4920
TIME
hh:mm
4900
4930
ELEV GAIN
ft
4940
PACE
min/mile
4950
HR
BPM

FIG 50

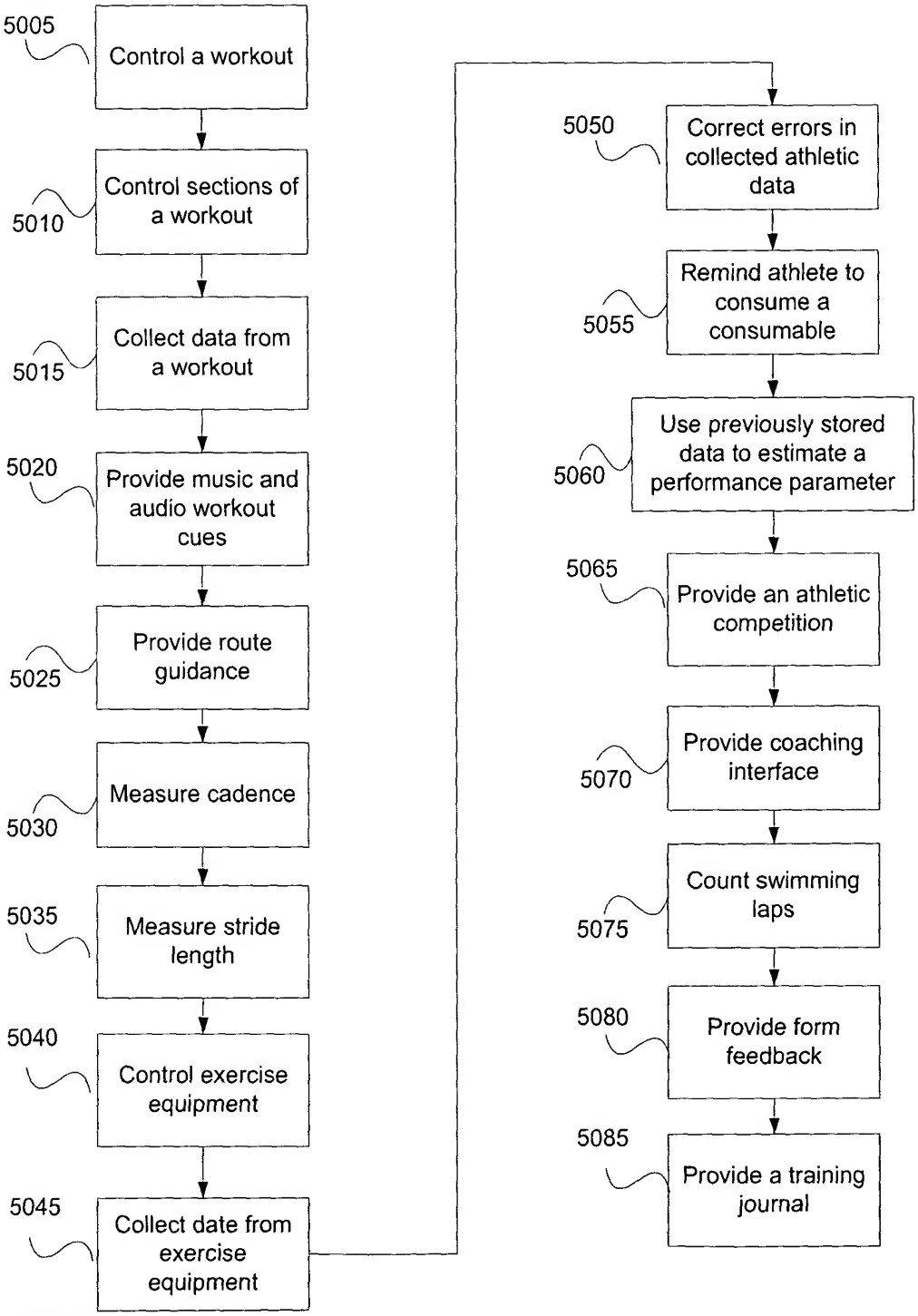
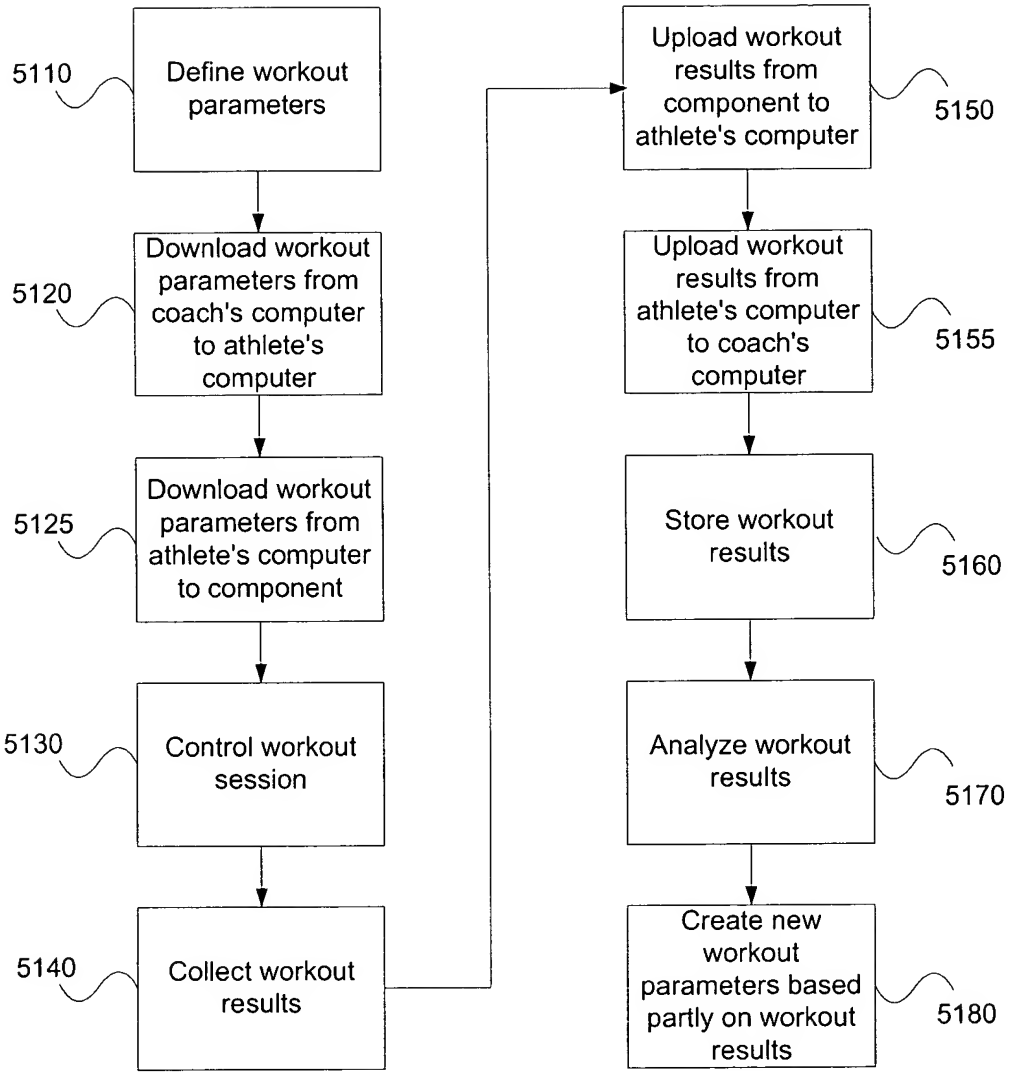
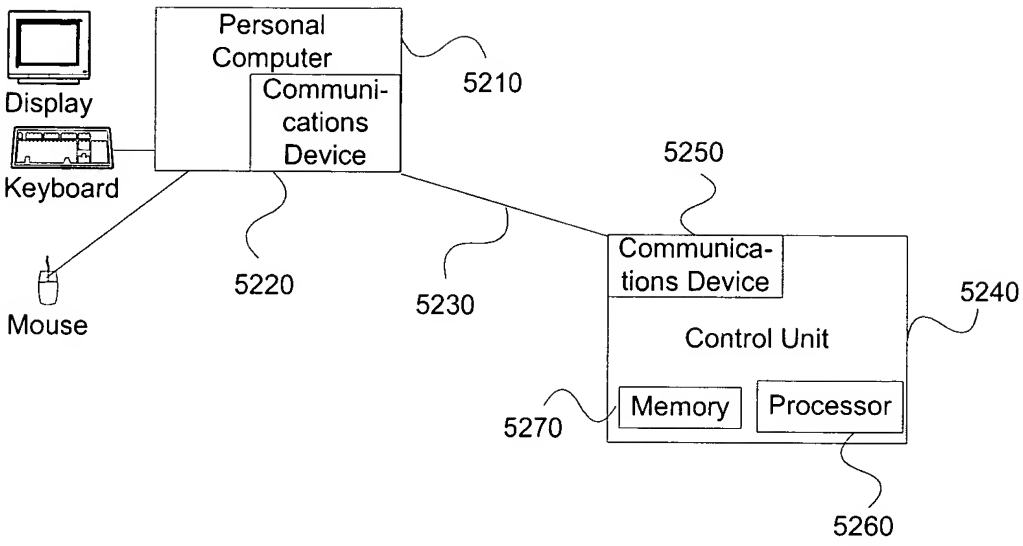

5005
Control a workout
5010
Control sections of a workout
5015
Collect data from a workout
5020
Provide music and audio workout cues
5025
Provide route guidance
5030
Measure cadence
5035
Measure stride length
5040
Control exercise equipment
5045
Collect date from exercise equipment
5050
Correct errors in collected athletic data
5055
Remind athlete to consume a consumable
5060
Use previously stored data to estimate a performance parameter
5065
Provide an athletic competition
5070
Provide coaching interface
5075
Count swimming laps
5080
Provide form feedback
5085
Provide a training journal

FIG 51


5110
Define workout parameters
5120
Download workout parameters from coach's computer to athlete's computer
5125
Download workout parameters from athlete's computer to component
5130
Control workout session
5140
Collect workout results
5150
Upload workout results from component to athlete's computer
5155
Upload workout results from athlete's computer to coach's computer
5160
Store workout results
5170
Analyze workout results
5180
Create new workout parameters based partly on workout results

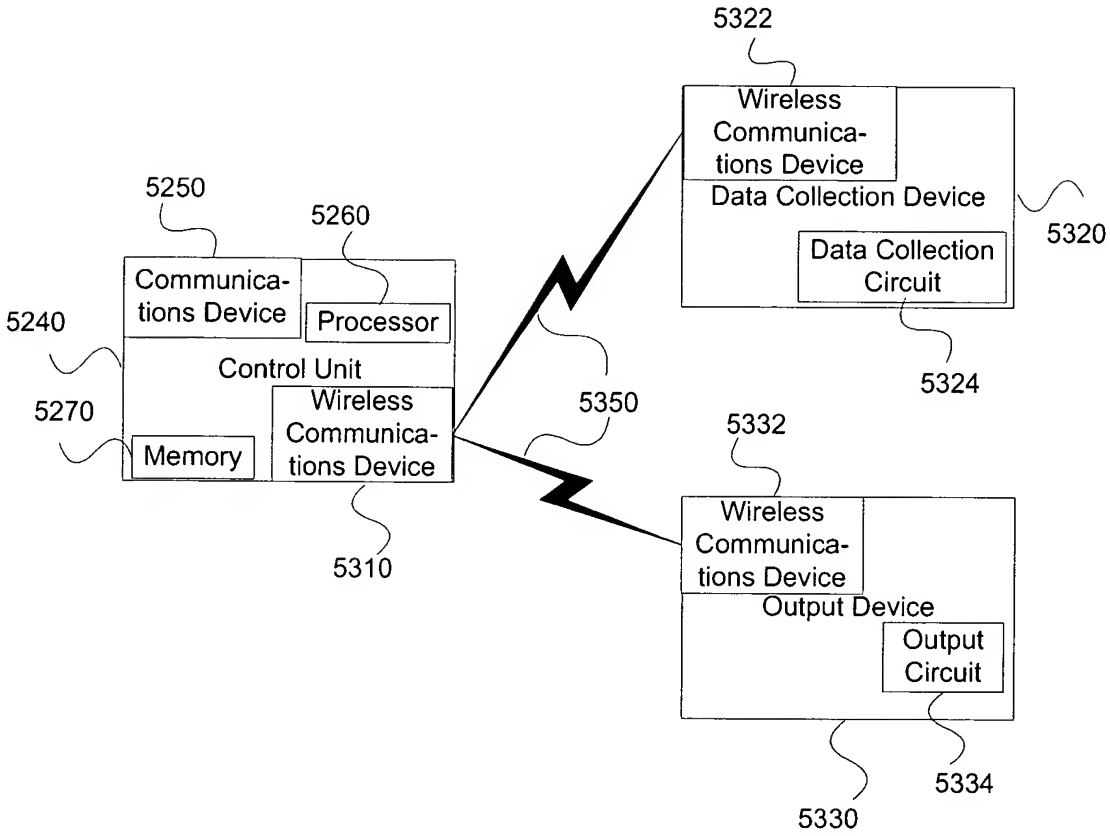
5100

FIG 52


Personal Computer
5210
Communi-cations Device
Display
Keyboard
Mouse
5220
5230
5250
Communica-tions Device
5240
Control Unit
Memory
Processor
5270
5260

5200

FIG 53


5322
Wireless Communica-tions Device
Data Collection Device
Data Collection Circuit
5320
5324
5250
5260
Communica-tions Device
Processor
5240
Control Unit
5270
Memory
Wireless Communica-tions Device
5310
5350
5332
Wireless Communica-tions Device
Output Device
Output Circuit
5330
5334

5300

FIG 54

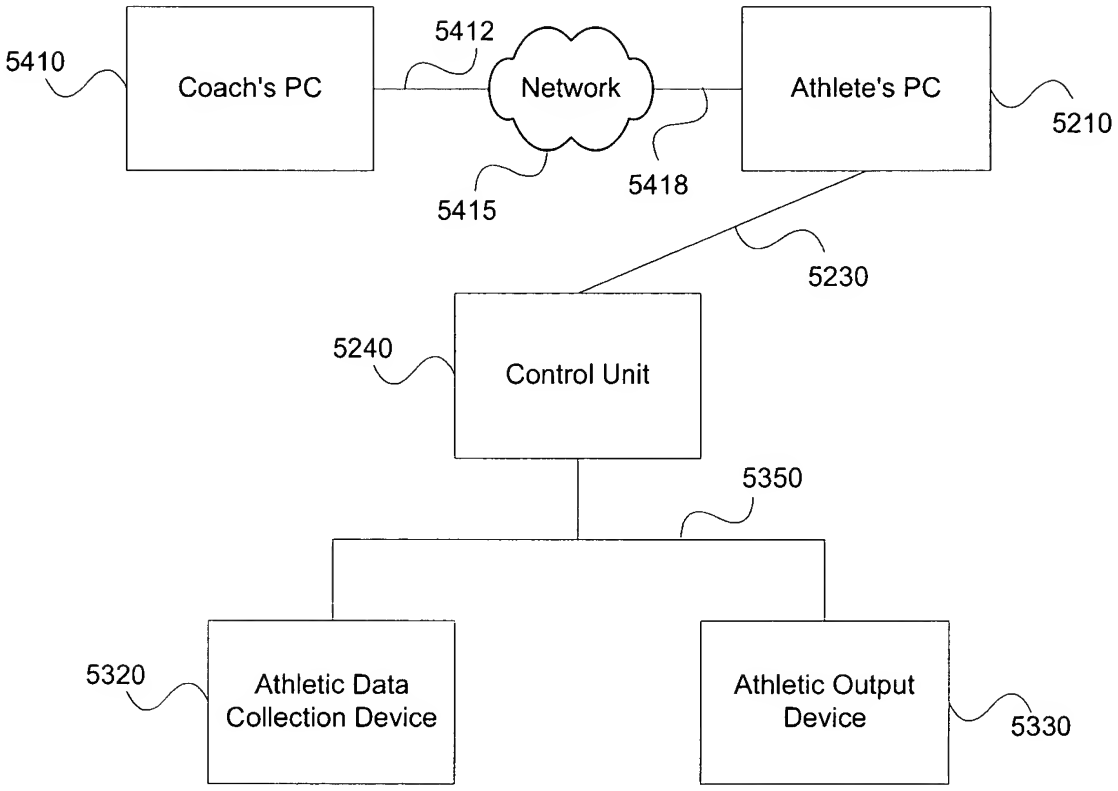
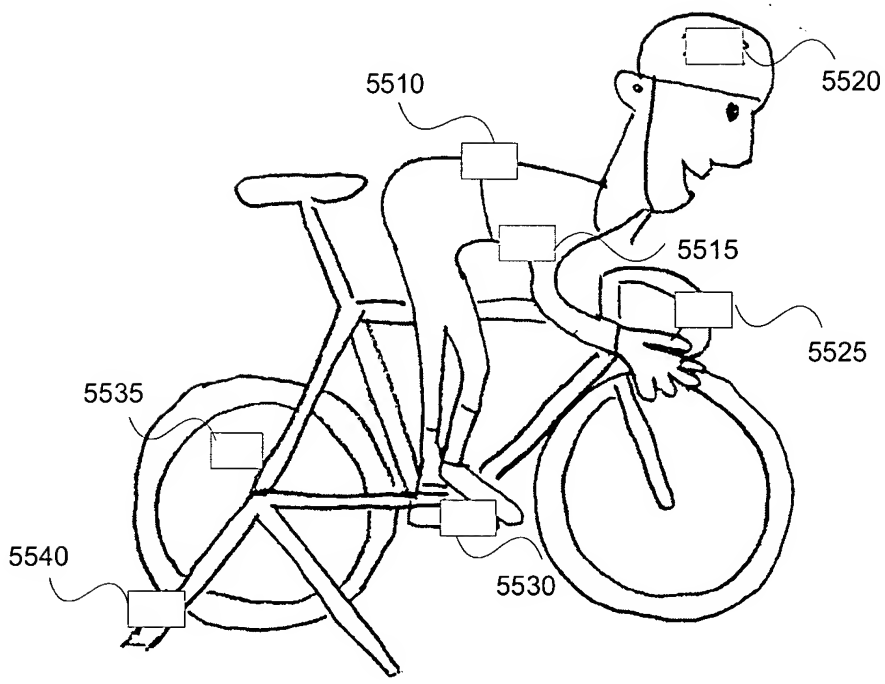

5410
Coach's PC
5412
Network
5415
5418
Athlete's PC
5210
5230
5240
Control Unit
5350
5320
Athletic Data Collection Device
Athletic Output Device
5330

FIG 55



5500

FIG 56

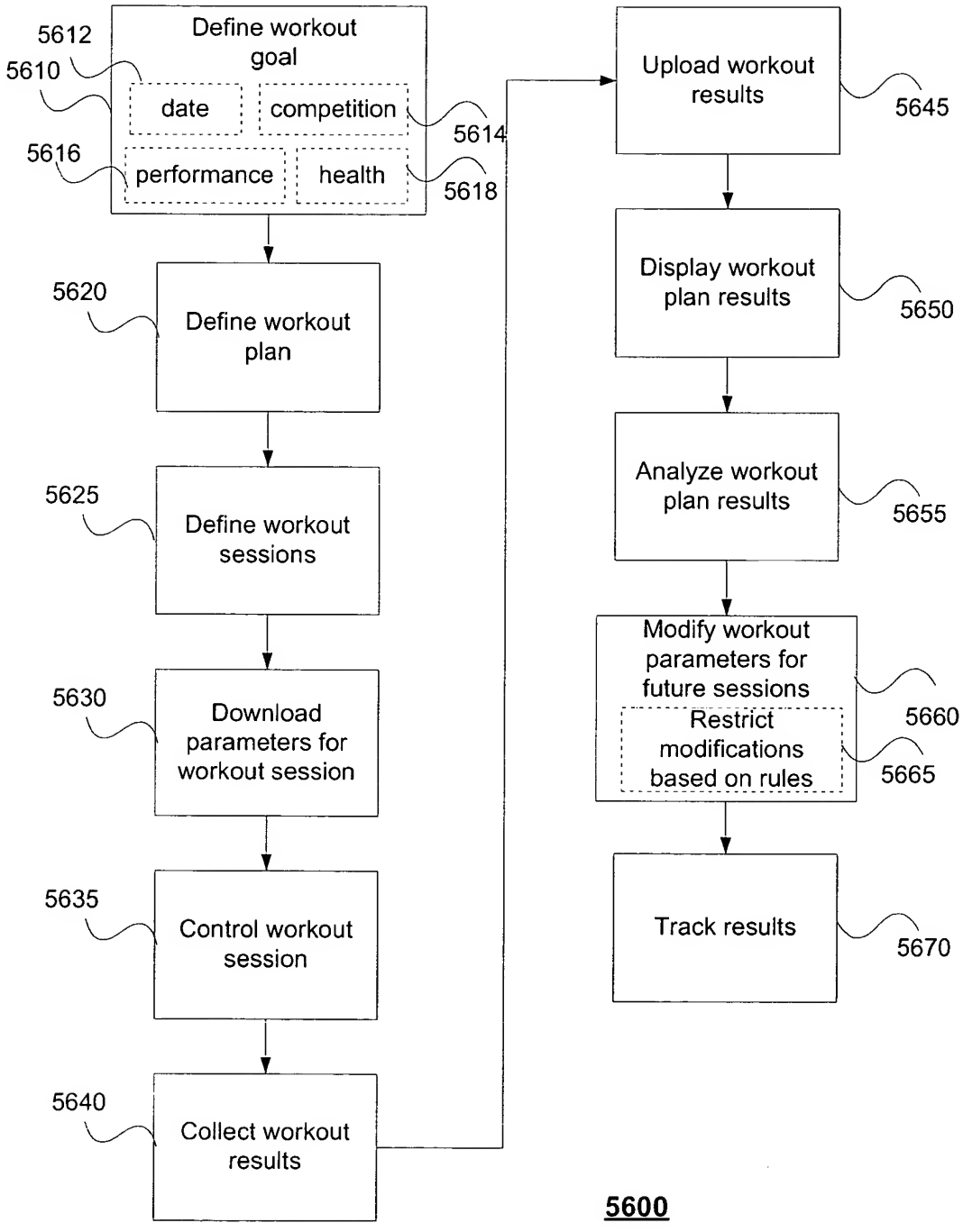
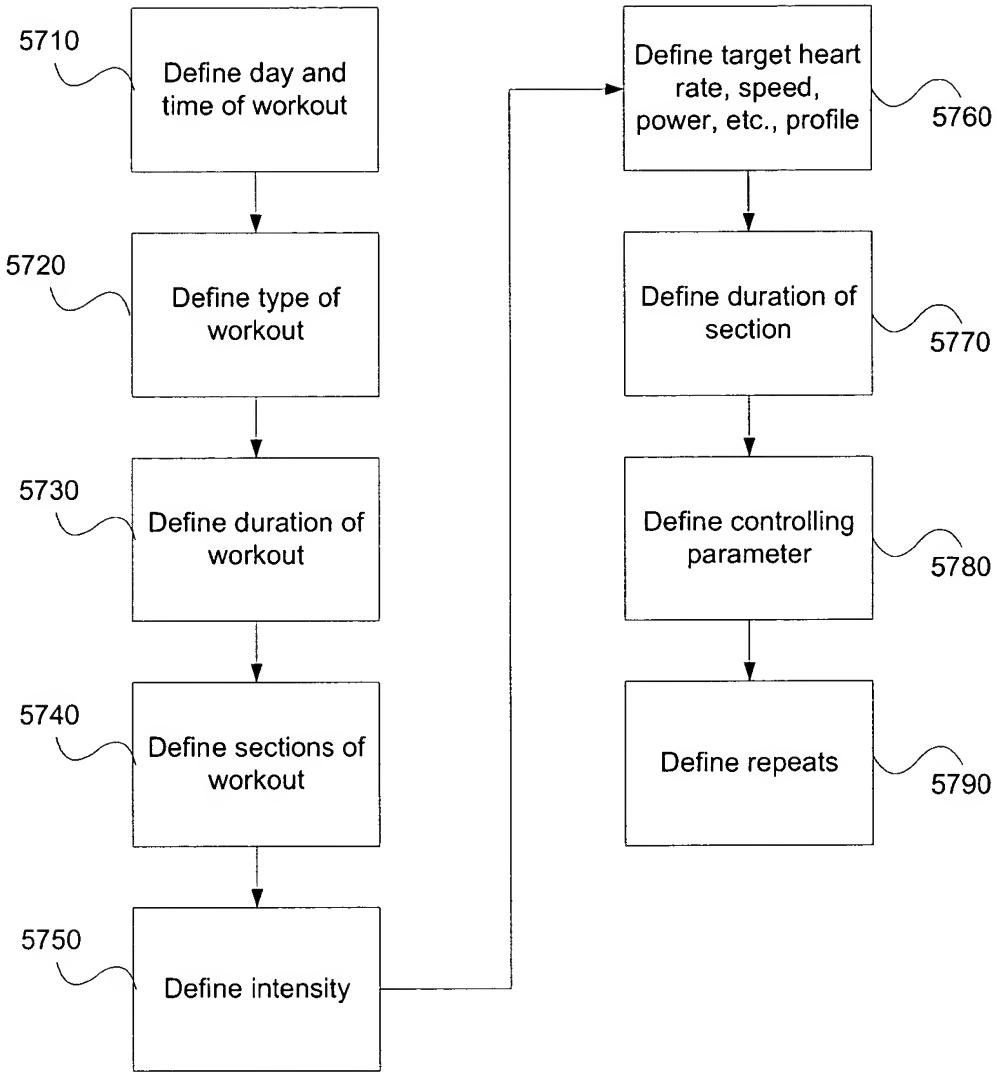
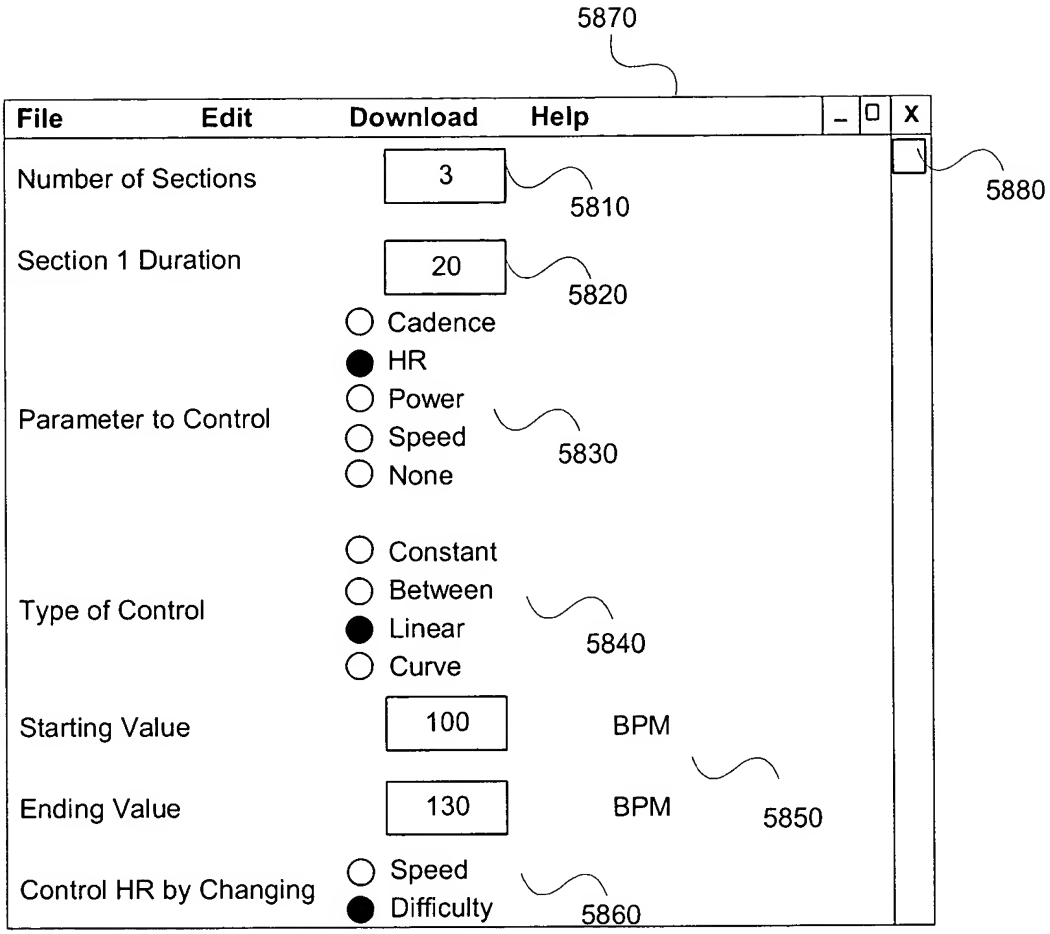

Define workout goal
5612
5610
date
competition
5614
5616
performance
health
5618
5620
Define workout plan
5625
Define workout sessions
5630
Download parameters for workout session
5635
Control workout session
5640
Collect workout results
Upload workout results
5645
Display workout plan results
5650
Analyze workout plan results
5655
Modify workout parameters for future sessions
5660
Restrict modifications based on rules
5665
Track results
5670
5600

FIG 57


5710
Define day and time of workout
5720
Define type of workout
5730
Define duration of workout
5740
Define sections of workout
5750
Define intensity
Define target heart rate, speed, power, etc., profile
5760
Define duration of section
5770
Define controlling parameter
5780
Define repeats
5790

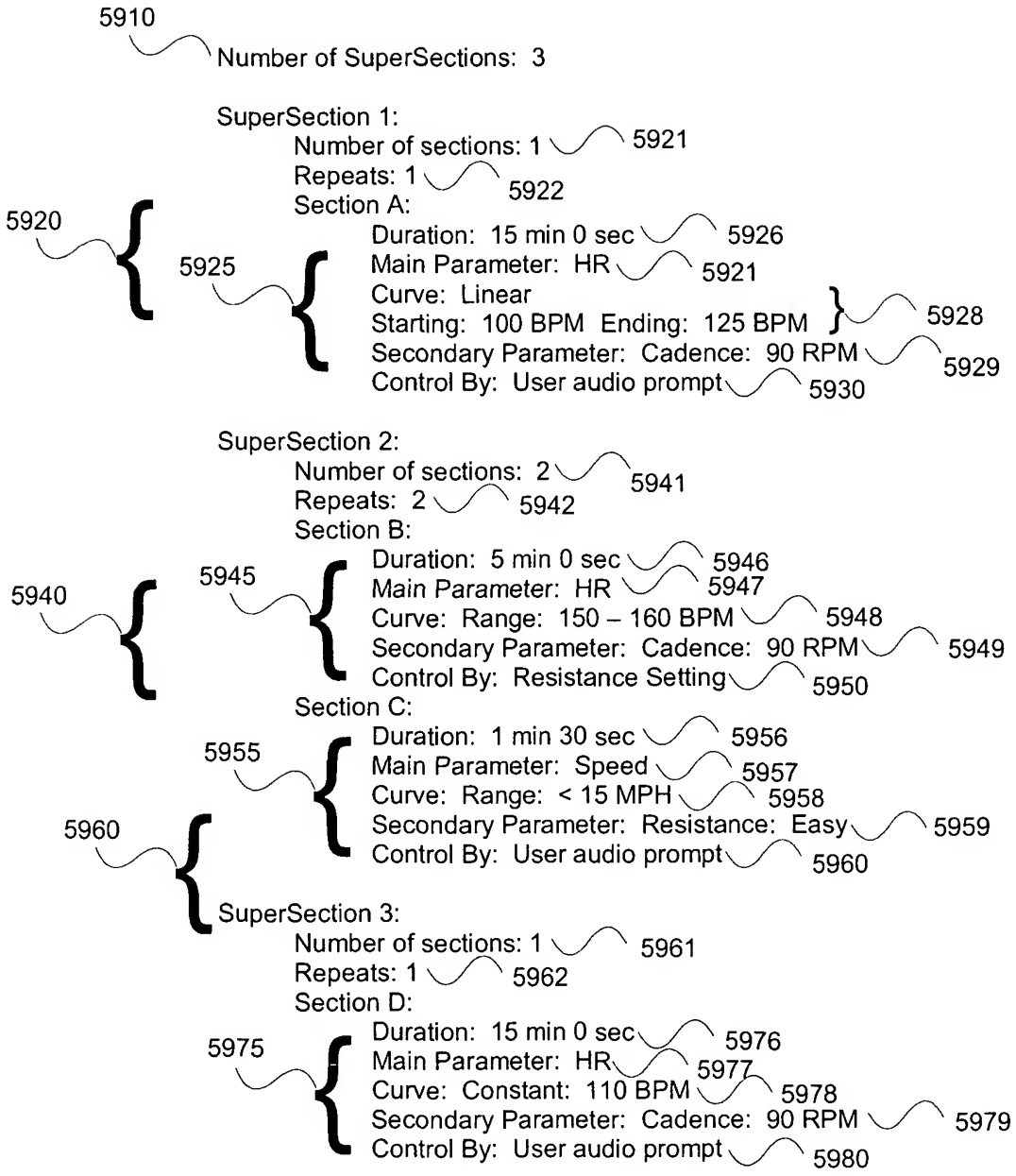
5700

FIG 58


5870
File
Edit
Download
Help
Number of Sections
3
5810
Section 1 Duration
20
5820
Cadence
HR
Power
Speed
None
Parameter to Control
5830
Constant
Between
Linear
Curve
Type of Control
5840
Starting Value
100
BPM
Ending Value
130
BPM
5850
Control HR by Changing
Speed
Difficulty
5860
5880

5800

FIG 59


5910
Number of SuperSections: 3
SuperSection 1:
Number of sections: 1
5921
Repeats: 1
5922
Section A:
5920
5925
Duration: 15 min 0 sec
5926
Main Parameter: HR
5921
Curve: Linear
Starting: 100 BPM Ending: 125 BPM
5928
Secondary Parameter: Cadence: 90 RPM
5929
Control By: User audio prompt
5930
SuperSection 2:
Number of sections: 2
5941
Repeats: 2
5942
Section B:
5940
5945
Duration: 5 min 0 sec
5946
Main Parameter: HR
5947
Curve: Range: 150 – 160 BPM
5948
Secondary Parameter: Cadence: 90 RPM
5949
Control By: Resistance Setting
5950
Section C:
5955
Duration: 1 min 30 sec
5956
Main Parameter: Speed
5957
Curve: Range: < 15 MPH
5958
Secondary Parameter: Resistance: Easy
5959
Control By: User audio prompt
5960
5960
SuperSection 3:
Number of sections: 1
5961
Repeats: 1
5962
Section D:
5975
Duration: 15 min 0 sec
5976
Main Parameter: HR
5977
Curve: Constant: 110 BPM
5978
Secondary Parameter: Cadence: 90 RPM
5979
Control By: User audio prompt
5980

5900

FIG 60

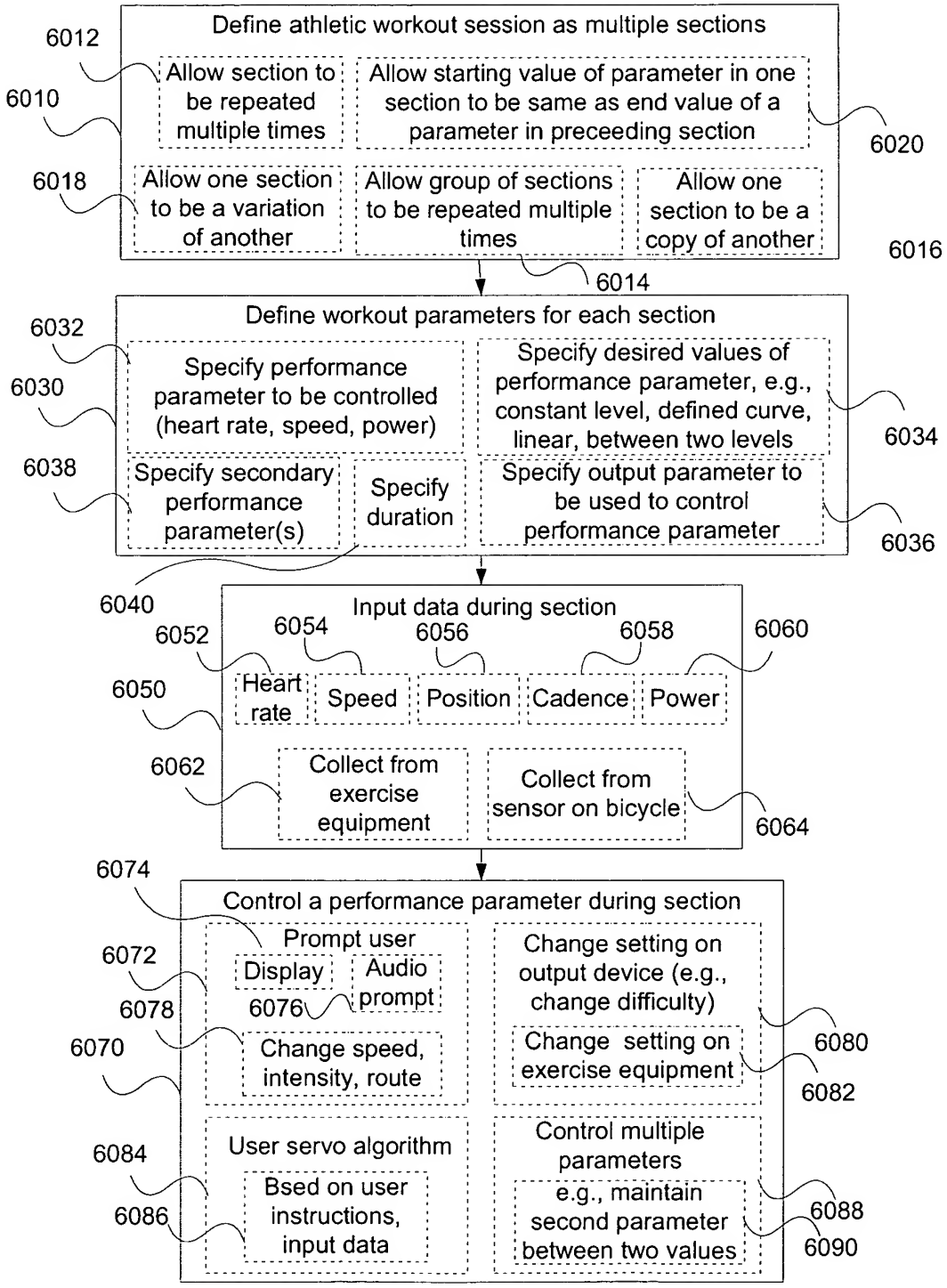

Define athletic workout session as multiple sections
6012
Allow section to be repeated multiple times
6010
Allow starting value of parameter in one section to be same as end value of a parameter in preceeding section
6020
6018
Allow one section to be a variation of another
Allow group of sections to be repeated multiple times
Allow one section to be a copy of another
6016
6014
Define workout parameters for each section
6032
Specify performance parameter to be controlled (heart rate, speed, power)
6030
Specify desired values of performance parameter, e.g., constant level, defined curve, linear, between two levels
6034
6038
Specify secondary performance parameter(s)
Specify duration
Specify output parameter to be used to control performance parameter
6036
6040
Input data during section
6052
6054
6056
6058
6060
6050
Heart rate
Speed
Position
Cadence
Power
6062
Collect from exercise equipment
Collect from sensor on bicycle
6064
6074
Control a performance parameter during section
Prompt user
6072
Display
Audio prompt
6076
6078
Change speed, intensity, route
6070
Change setting on output device (e.g., change difficulty)
6080
Change setting on exercise equipment
6082
User servo algorithm
6084
Bsed on user instructions, input data
6086
Control multiple parameters
6088
e.g., maintain second parameter between two values
6090

FIG 61

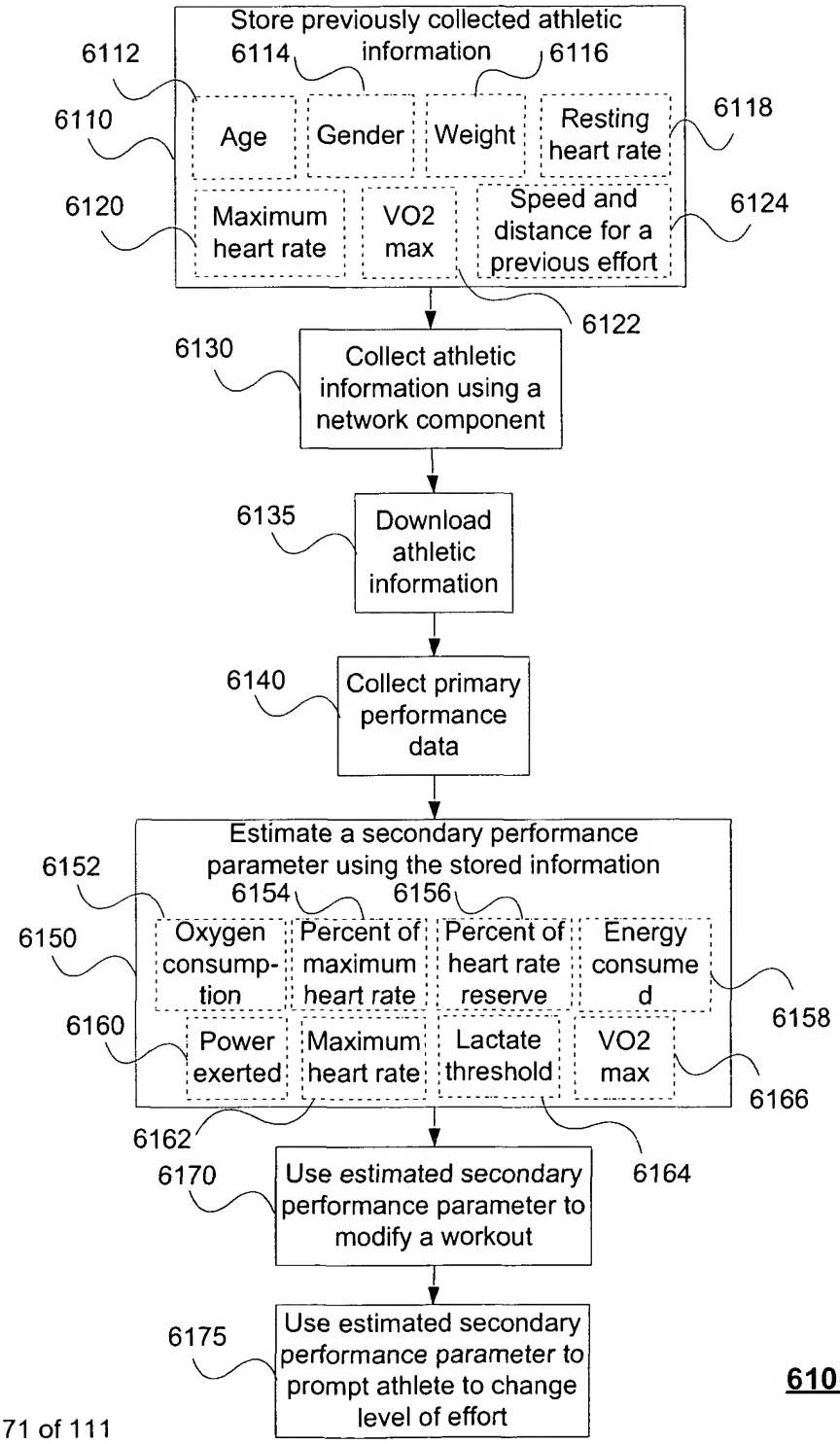
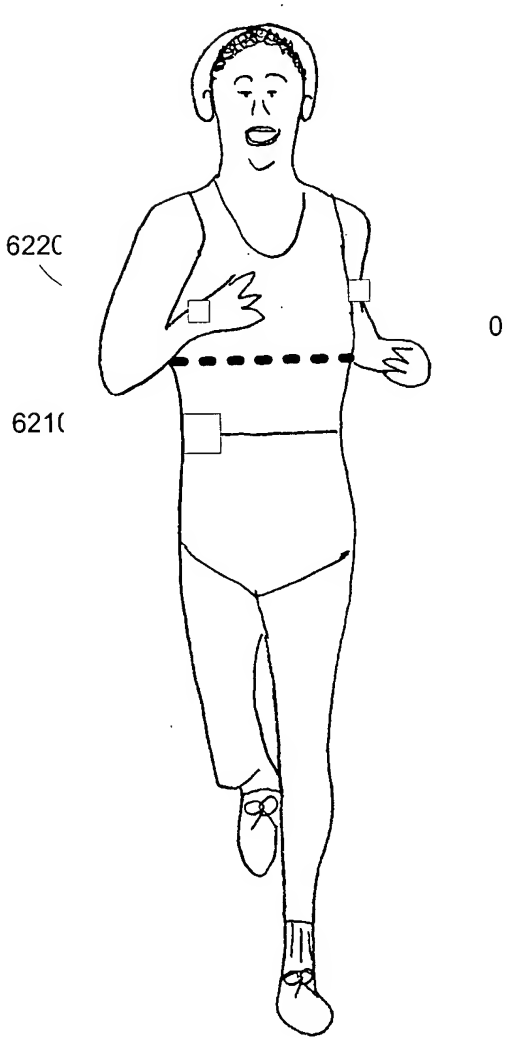

Store previously collected athletic information
6112
6114
6116
6110
Age
Gender
Weight
Resting heart rate
6118
6120
Maximum heart rate
VO2 max
Speed and distance for a previous effort
6124
6122
6130
Collect athletic information using a network component
6135
Download athletic information
6140
Collect primary performance data
Estimate a secondary performance parameter using the stored information
6152
6154
6156
6150
Oxygen consump-tion
Percent of maximum heart rate
Percent of heart rate reserve
Energy consume d
6158
6160
Power exerted
Maximum heart rate
Lactate threshold
VO2 max
6166
6162
6164
6170
Use estimated secondary performance parameter to modify a workout
6175
Use estimated secondary performance parameter to prompt athlete to change level of effort
6100

FIG 62



6200

FIG 63

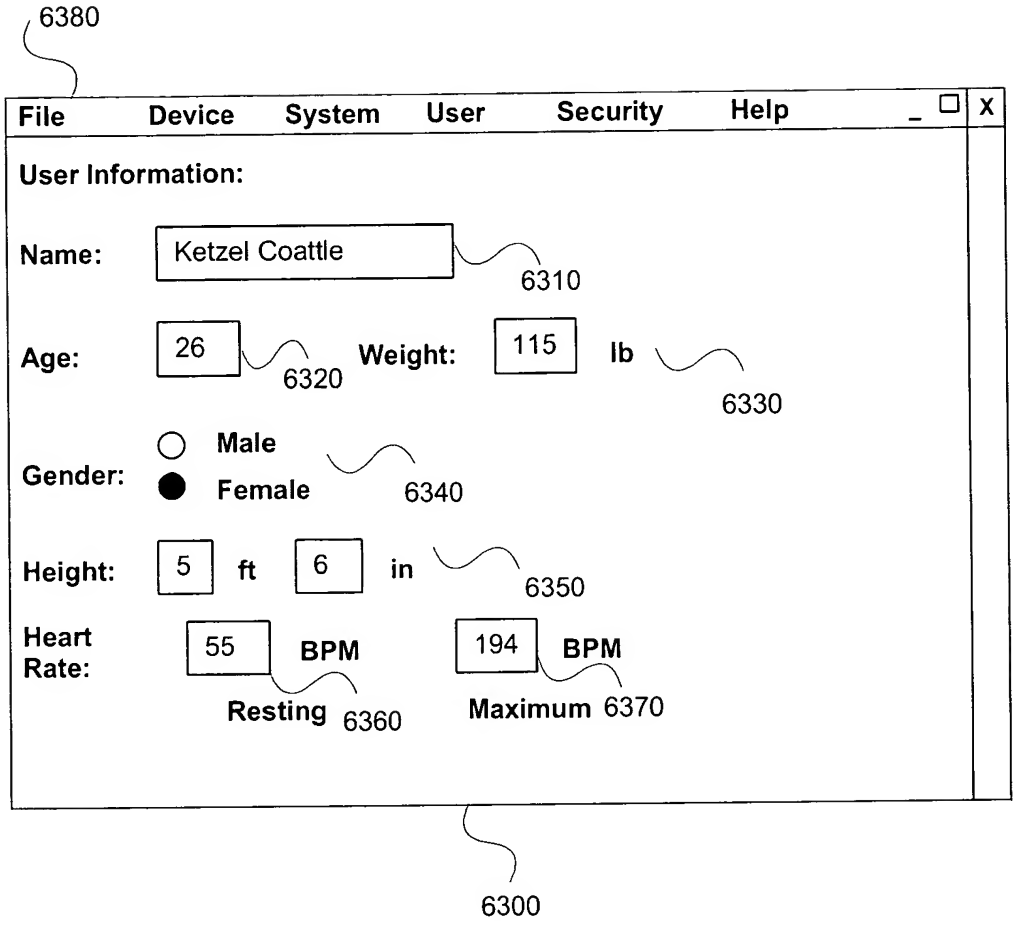
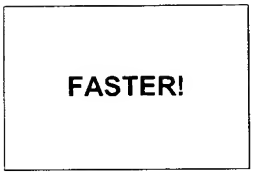
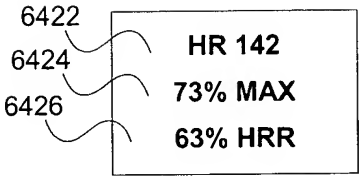

6380
File
Device
System
User
Security
Help
_
X
User Information:
Name:
Ketzel Coattle
6310
Age:
26
6320
Weight:
115
lb
6330
Gender:
Male
Female
6340
Height:
5
ft
6
in
6350
Heart Rate:
55
BPM
Resting
6360
194
BPM
Maximum
6370
6300

FIG 64A



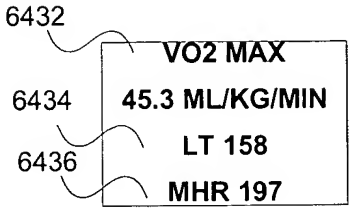
6410

FIG 64B



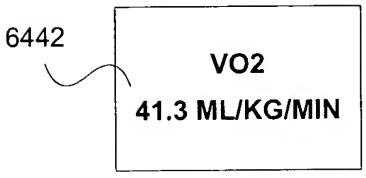
6420

FIG 64C



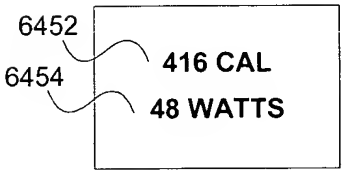
6430

FIG 64D



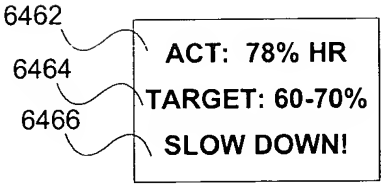
6440

FIG 64E



6450

FIG 64F



6460

FIG 65

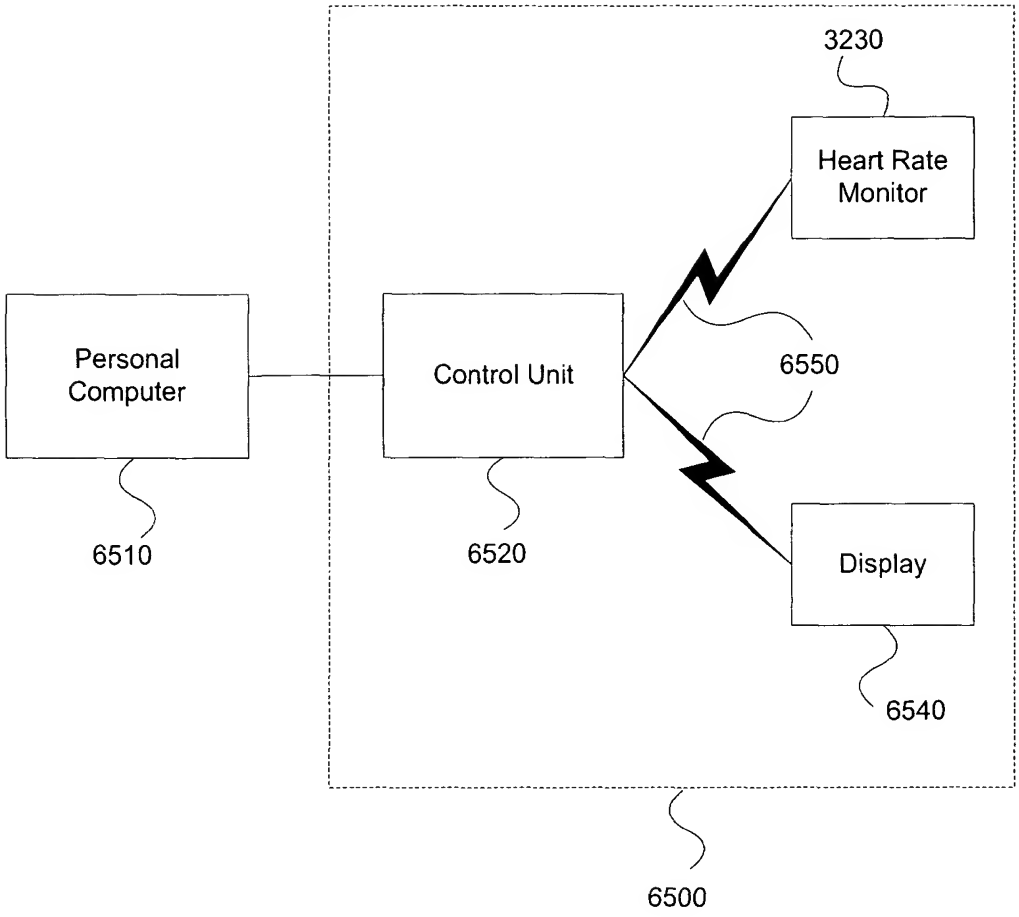
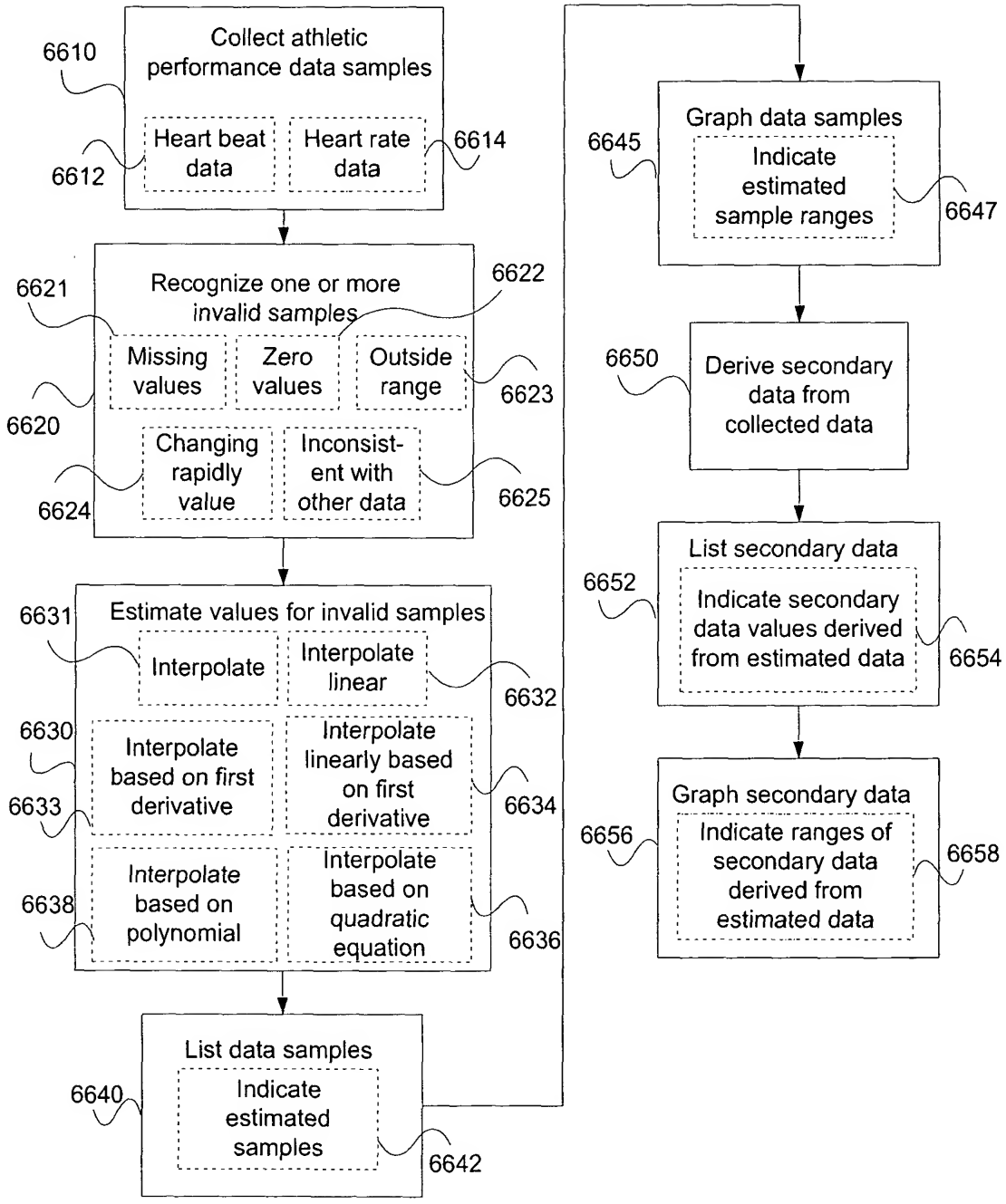
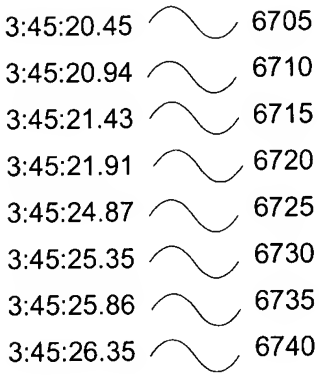

3230
Heart Rate Monitor
Personal Computer
Control Unit
6550
6510
6520
Display
6540
6500

FIG 66


Collect athletic performance data samples
6610
Heart beat data
6612
Heart rate data
6614
Recognize one or more invalid samples
6621
6622
Missing values
Zero values
Outside range
6623
6620
Changing rapidly value
6624
Inconsist-ent with other data
6625
Estimate values for invalid samples
6631
Interpolate
Interpolate linear
6632
6630
Interpolate based on first derivative
Interpolate linearly based on first derivative
6633
6634
Interpolate based on polynomial
6638
Interpolate based on quadratic equation
6636
List data samples
6640
Indicate estimated samples
6642
Graph data samples
6645
Indicate estimated sample ranges
6647
Derive secondary data from collected data
6650
List secondary data
6652
Indicate secondary data values derived from estimated data
6654
Graph secondary data
6656
Indicate ranges of secondary data derived from estimated data
6658

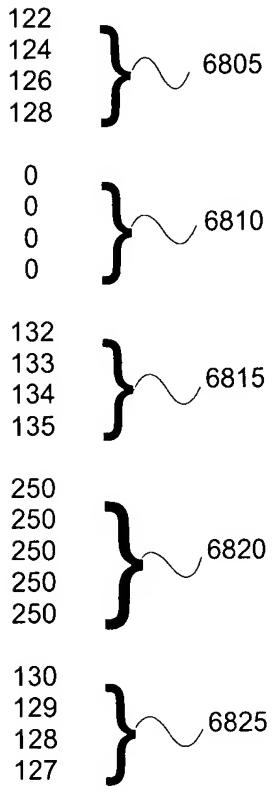
6600

FIG 67


3:45:20.45
6705
3:45:20.94
6710
3:45:21.43
6715
3:45:21.91
6720
3:45:24.87
6725
3:45:25.35
6730
3:45:25.86
6735
3:45:26.35
6740

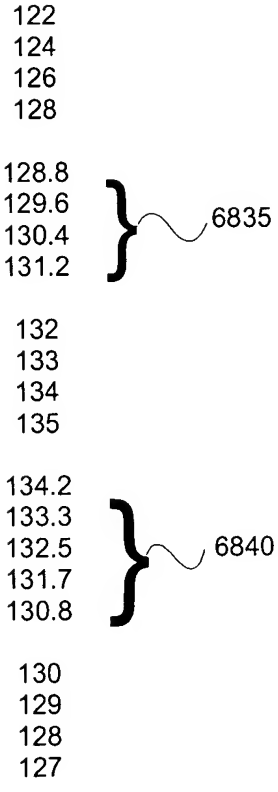
6700

FIG 68A



6800

FIG 68B



6830

FIG 69A

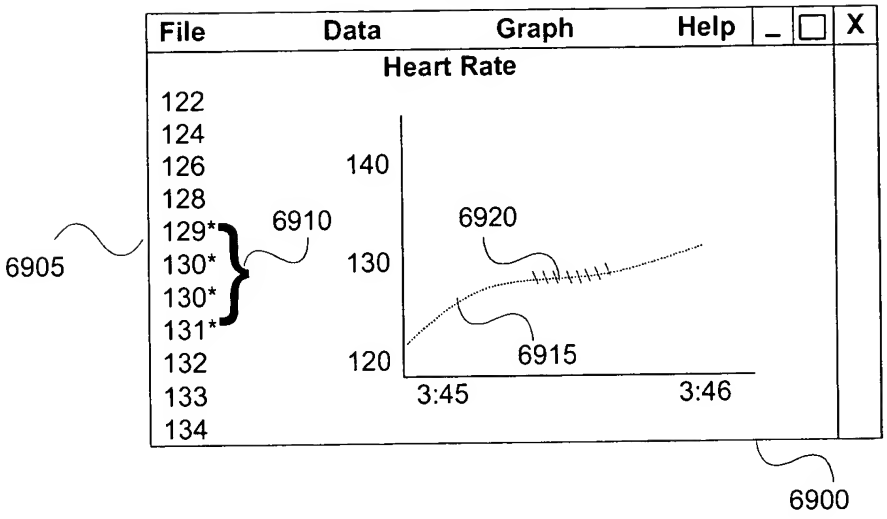


FIG 69B

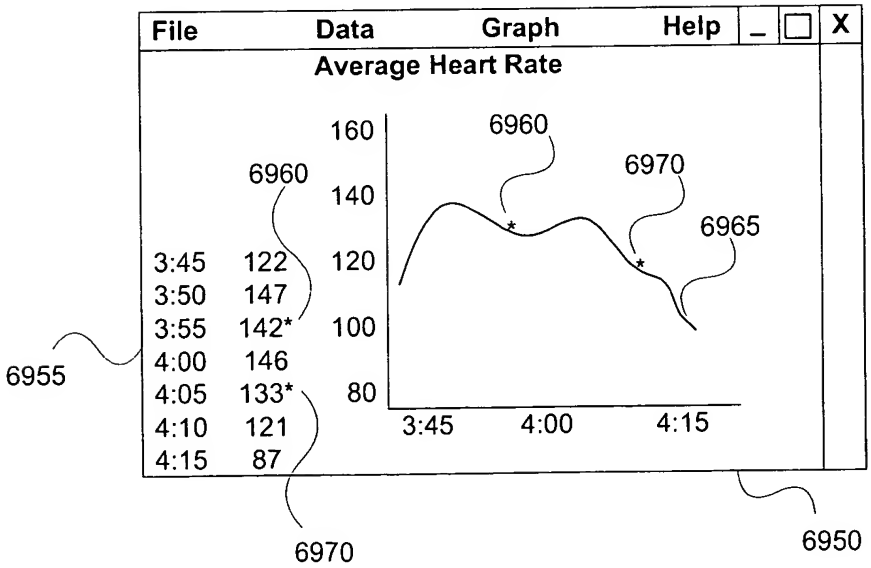


FIG 70

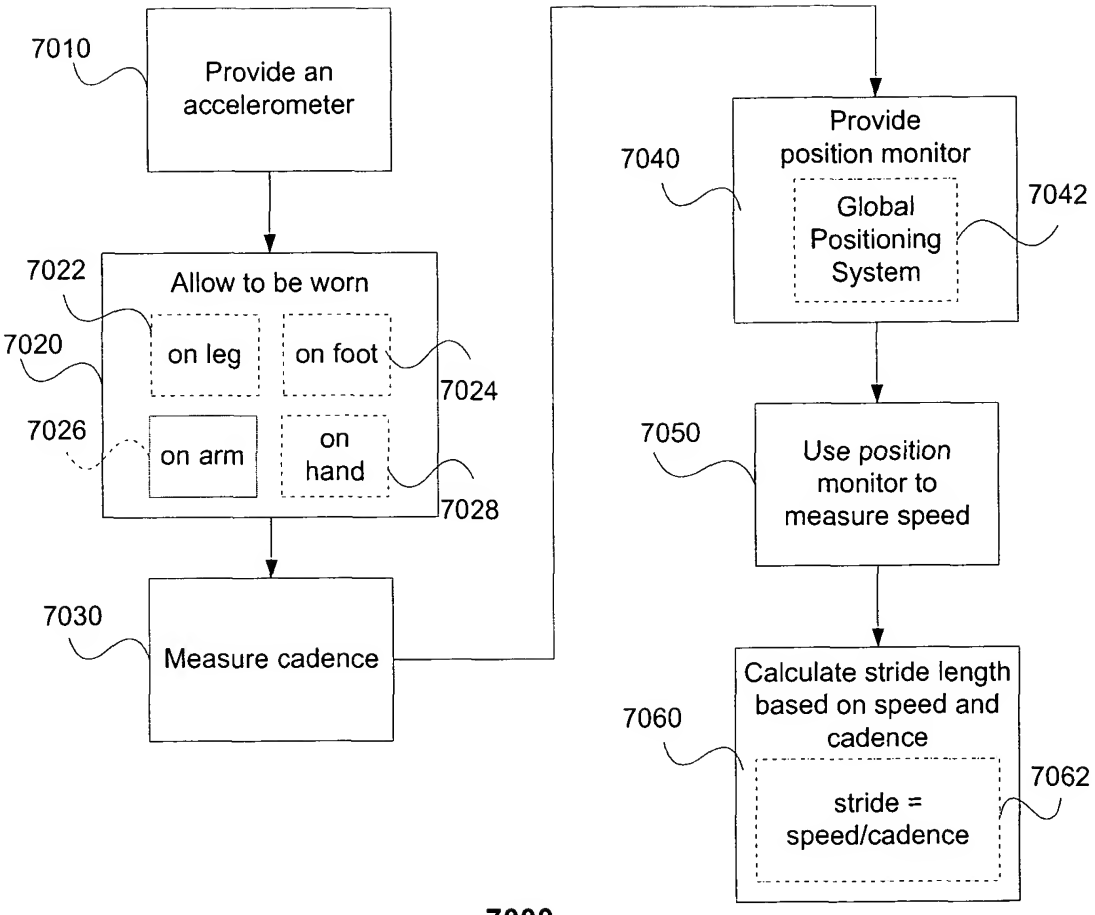
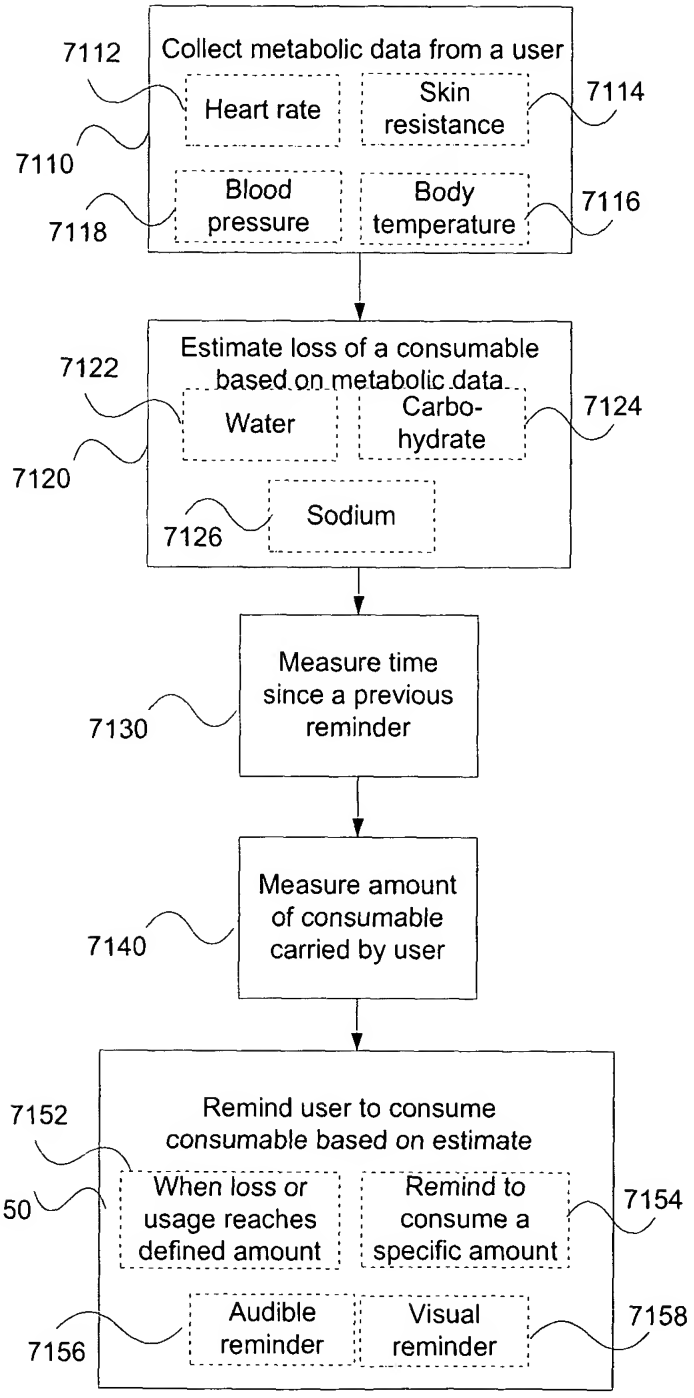

7010
Provide an accelerometer
7022
Allow to be worn
on leg
on foot
7024
7020
7026
on arm
on hand
7028
7030
Measure cadence
7040
Provide position monitor
Global Positioning System
7042
7050
Use position monitor to measure speed
7060
Calculate stride length based on speed and cadence
stride = speed/cadence
7062
7000

FIG 71


Collect metabolic data from a user
7112
Heart rate
Skin resistance
7114
7110
Blood pressure
Body temperature
7116
7118
Estimate loss of a consumable based on metabolic data
7122
Water
Carbo-hydrate
7124
7120
Sodium
7126
Measure time since a previous reminder
7130
Measure amount of consumable carried by user
7140
Remind user to consume consumable based on estimate
7152
When loss or usage reaches defined amount
Remind to consume a specific amount
7154
7150
Audible reminder
Visual reminder
7158
7156

7100

FIG 72

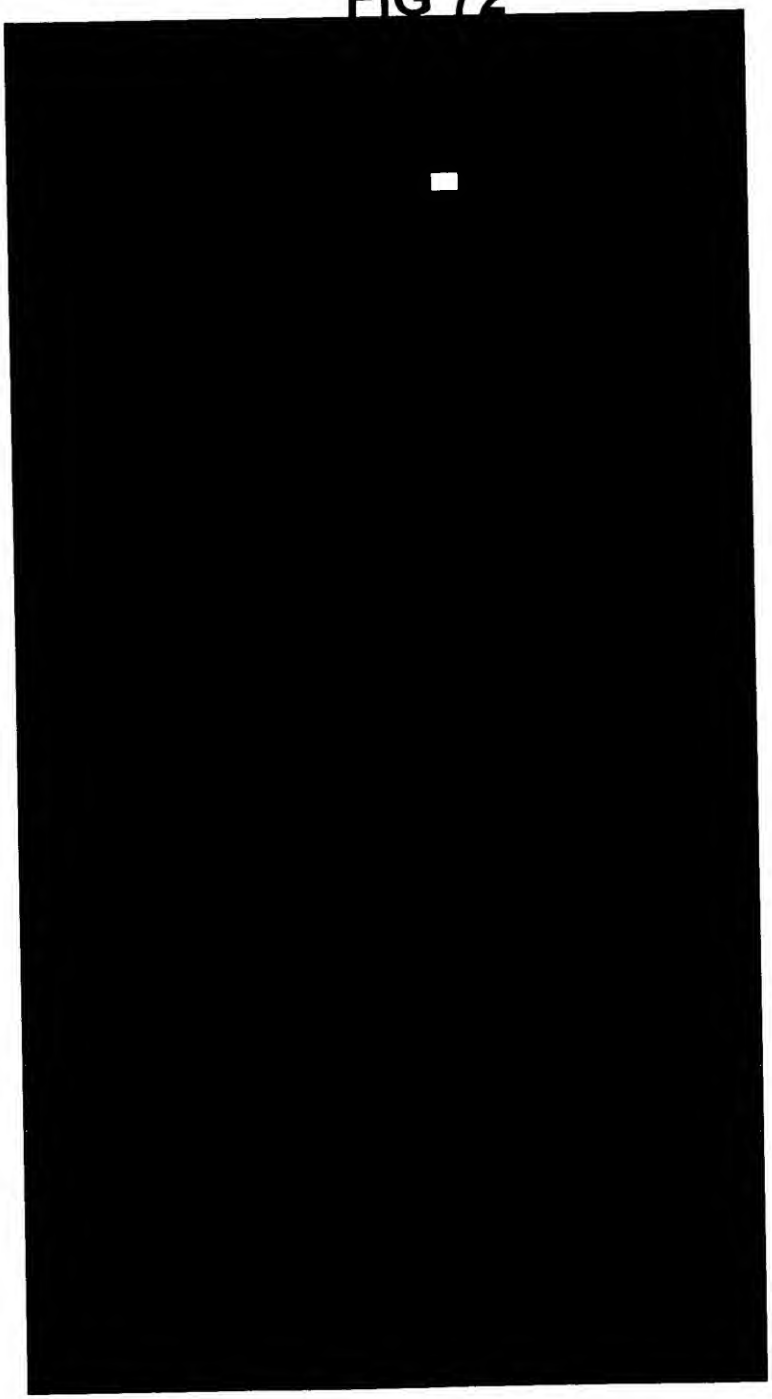
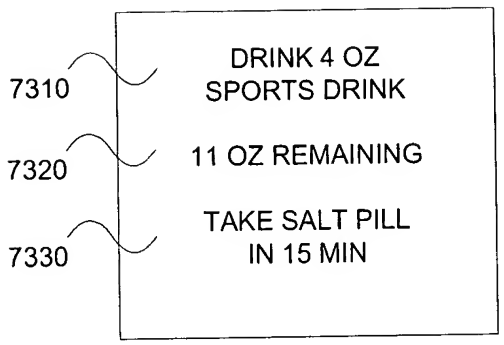
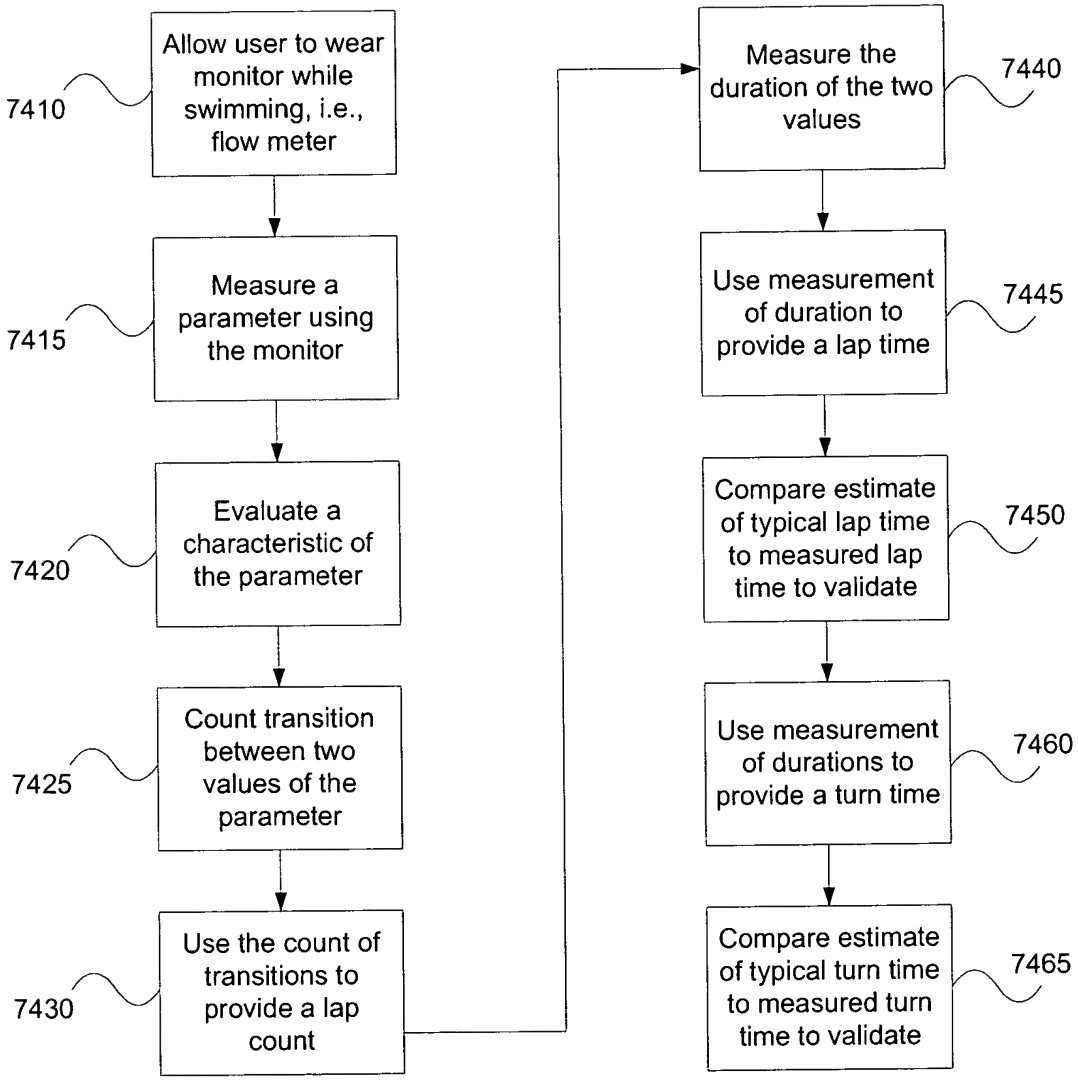


FIG 73


7310
DRINK 4 OZ
SPORTS DRINK
7320
11 OZ REMAINING
7330
TAKE SALT PILL
IN 15 MIN

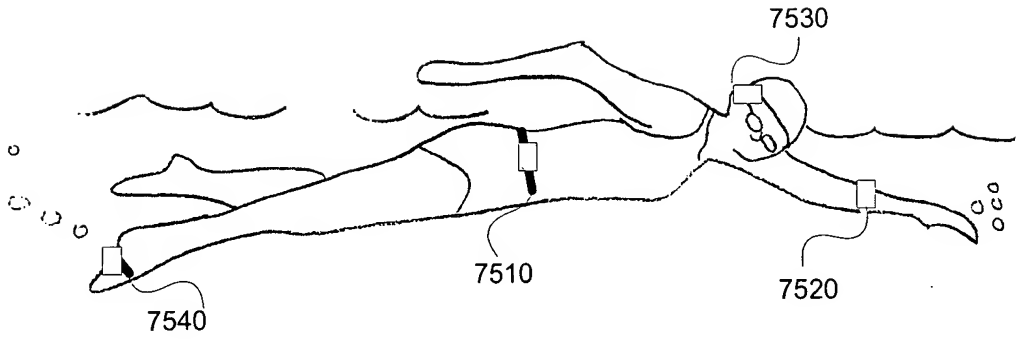
7300

FIG 74


Allow user to wear monitor while swimming, i.e., flow meter
7410
Measure a parameter using the monitor
7415
Evaluate a characteristic of the parameter
7420
Count transition between two values of the parameter
7425
Use the count of transitions to provide a lap count
7430
Measure the duration of the two values
7440
Use measurement of duration to provide a lap time
7445
Compare estimate of typical lap time to measured lap time to validate
7450
Use measurement of durations to provide a turn time
7460
Compare estimate of typical turn time to measured turn time to validate
7465

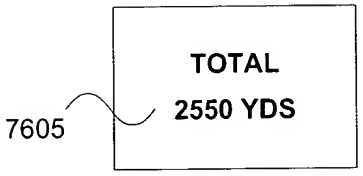
7400

FIG 75



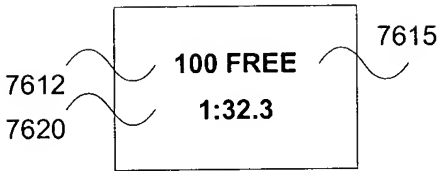
7500

FIG 76A



7600

FIG 76B



7610

FIG 77

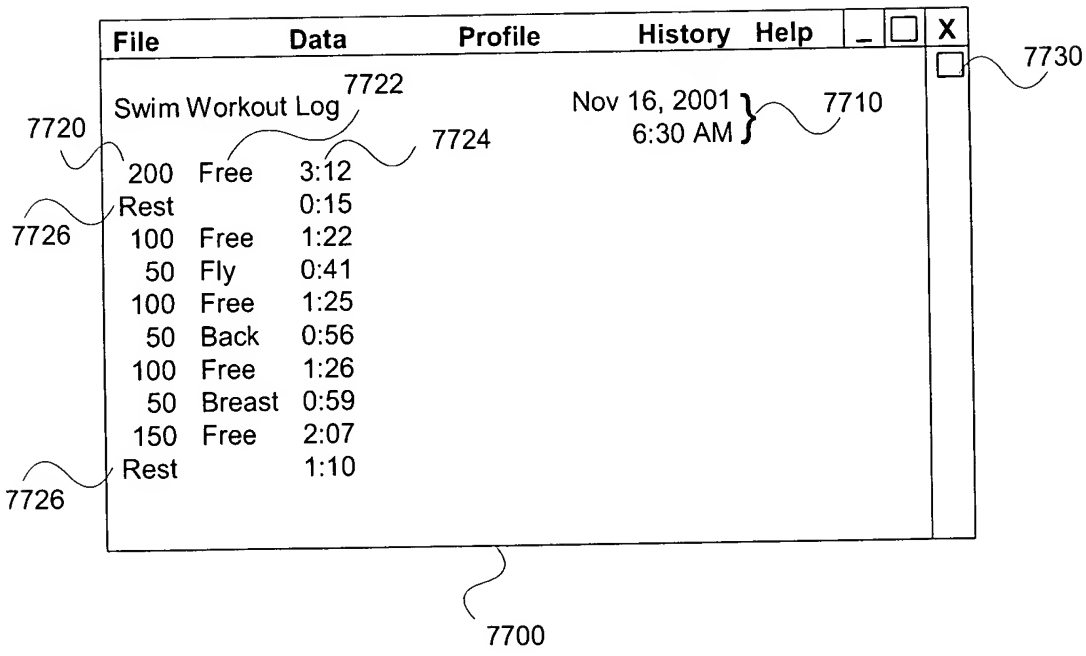
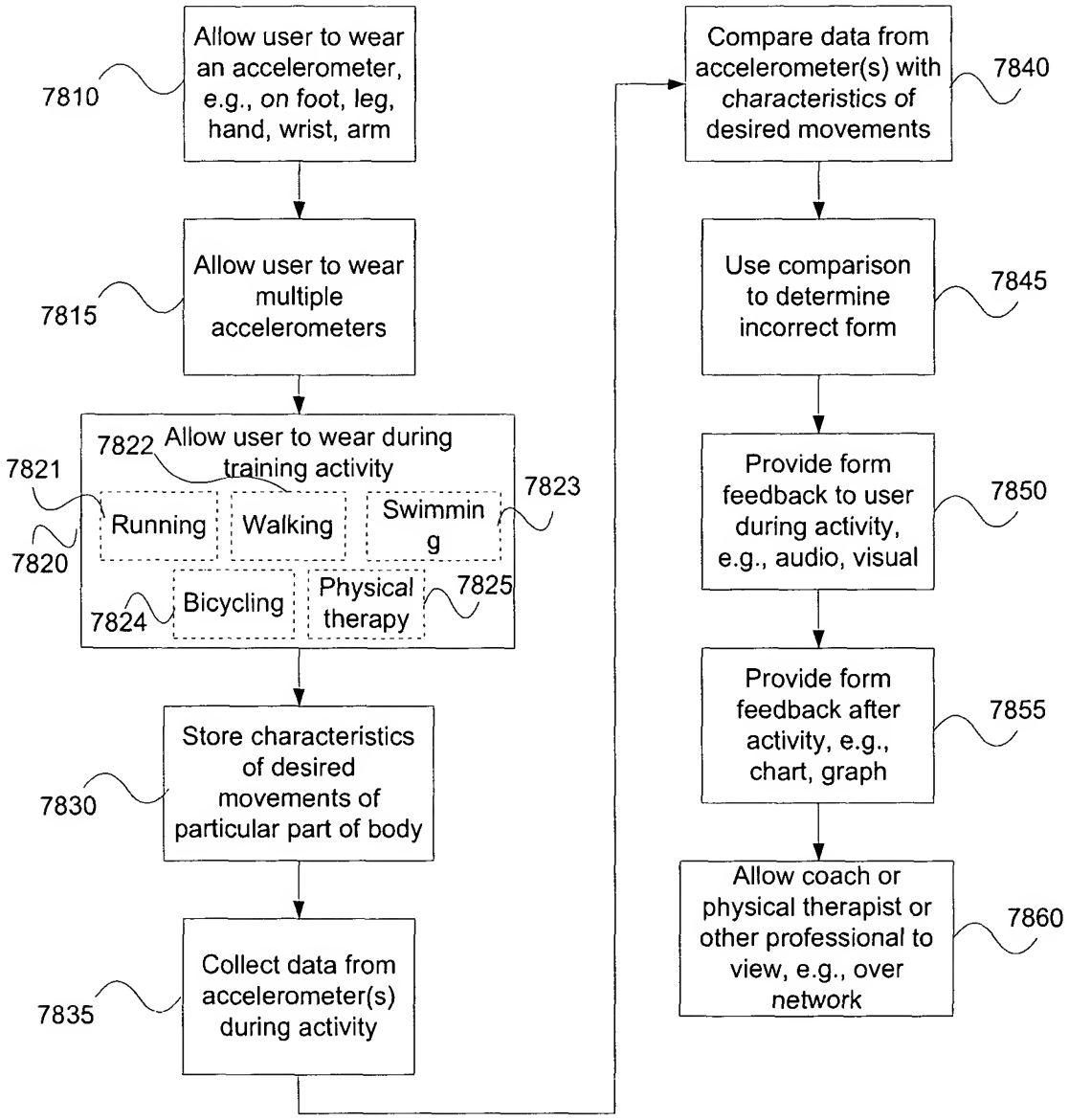
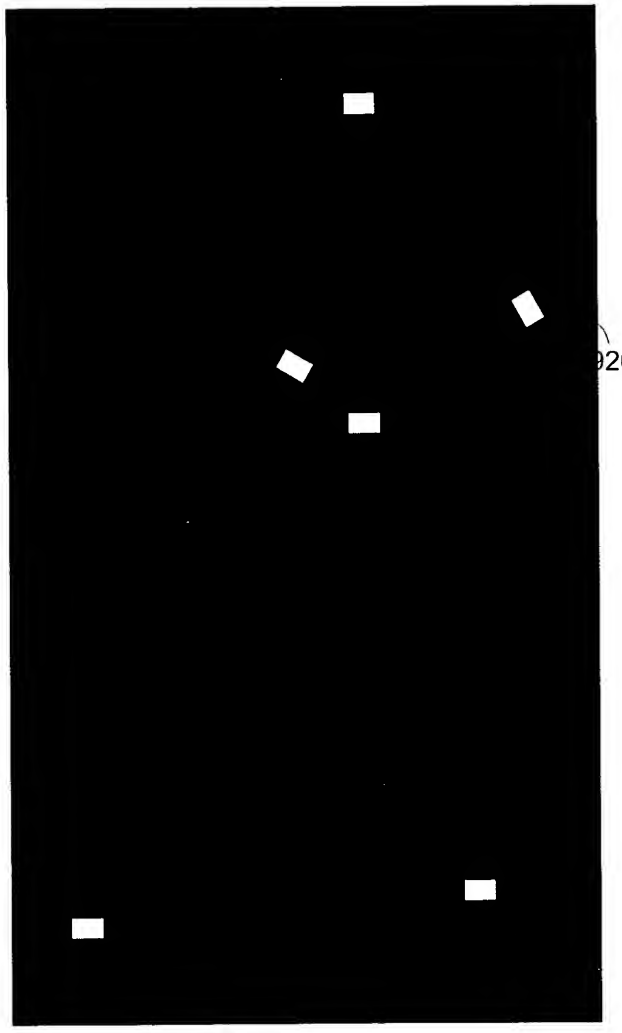

File
Data
Profile
History
Help
_
X
7730
7722
Swim Workout Log
Nov 16, 2001
6:30 AM
7710
7720
7724
200 Free 3:12
Rest 0:15
7726
100 Free 1:22
50 Fly 0:41
100 Free 1:25
50 Back 0:56
100 Free 1:26
50 Breast 0:59
150 Free 2:07
Rest 1:10
7726
7700

FIG 78


Allow user to wear an accelerometer, e.g., on foot, leg, hand, wrist, arm
7810
Allow user to wear multiple accelerometers
7815
Allow user to wear during training activity
7822
7821
Running
Walking
Swimmin g
7823
7820
Bicycling
Physical therapy
7825
7824
Store characteristics of desired movements of particular part of body
7830
Collect data from accelerometer(s) during activity
7835
Compare data from accelerometer(s) with characteristics of desired movements
7840
Use comparison to determine incorrect form
7845
Provide form feedback to user during activity, e.g., audio, visual
7850
Provide form feedback after activity, e.g., chart, graph
7855
Allow coach or physical therapist or other professional to view, e.g., over network
7860

7800

FIG 79



7900

FIG 80A

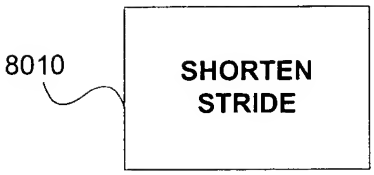


FIG 80B

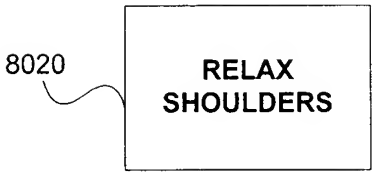


FIG 80C

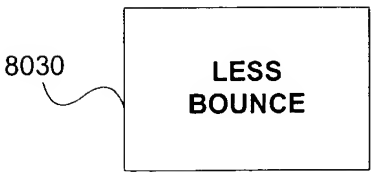
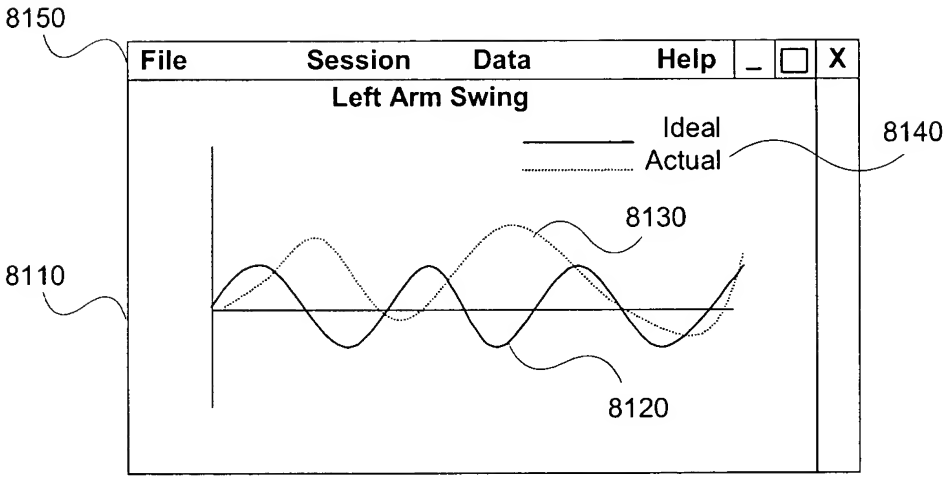
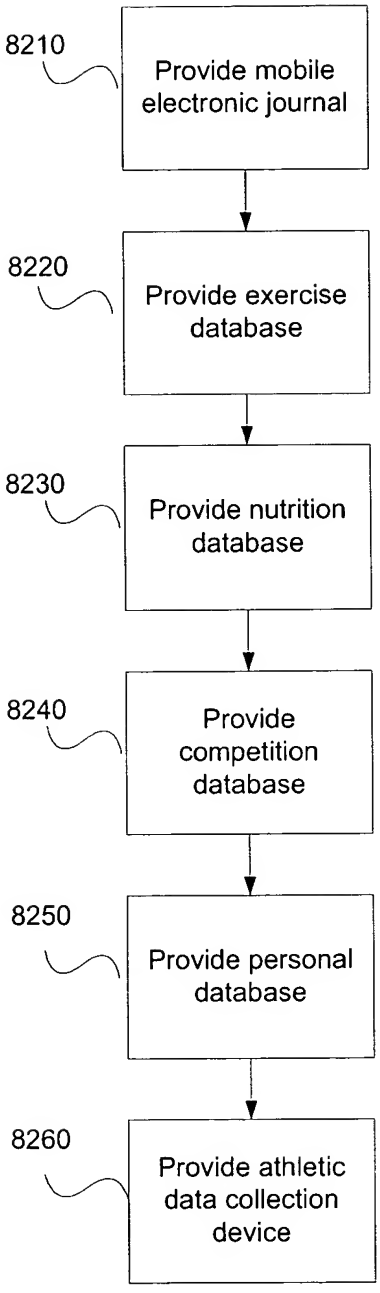


FIG 81


8150
File
Session
Data
Help
_
X
Left Arm Swing
Ideal
Actual
8140
8130
8110
8120

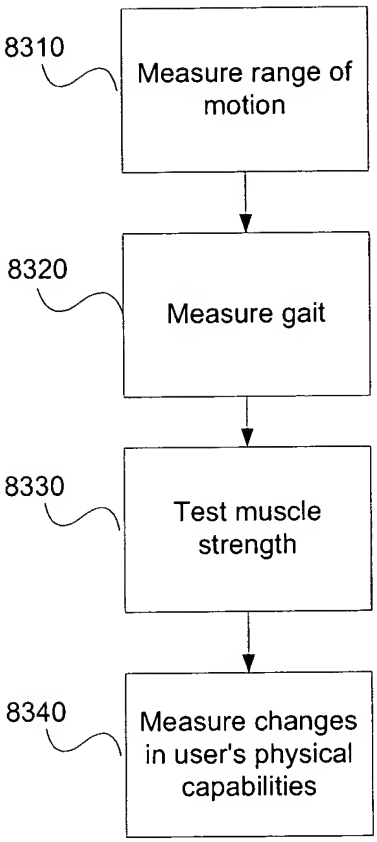
8100

FIG 82



8200

FIG 83



3255

FIG 84

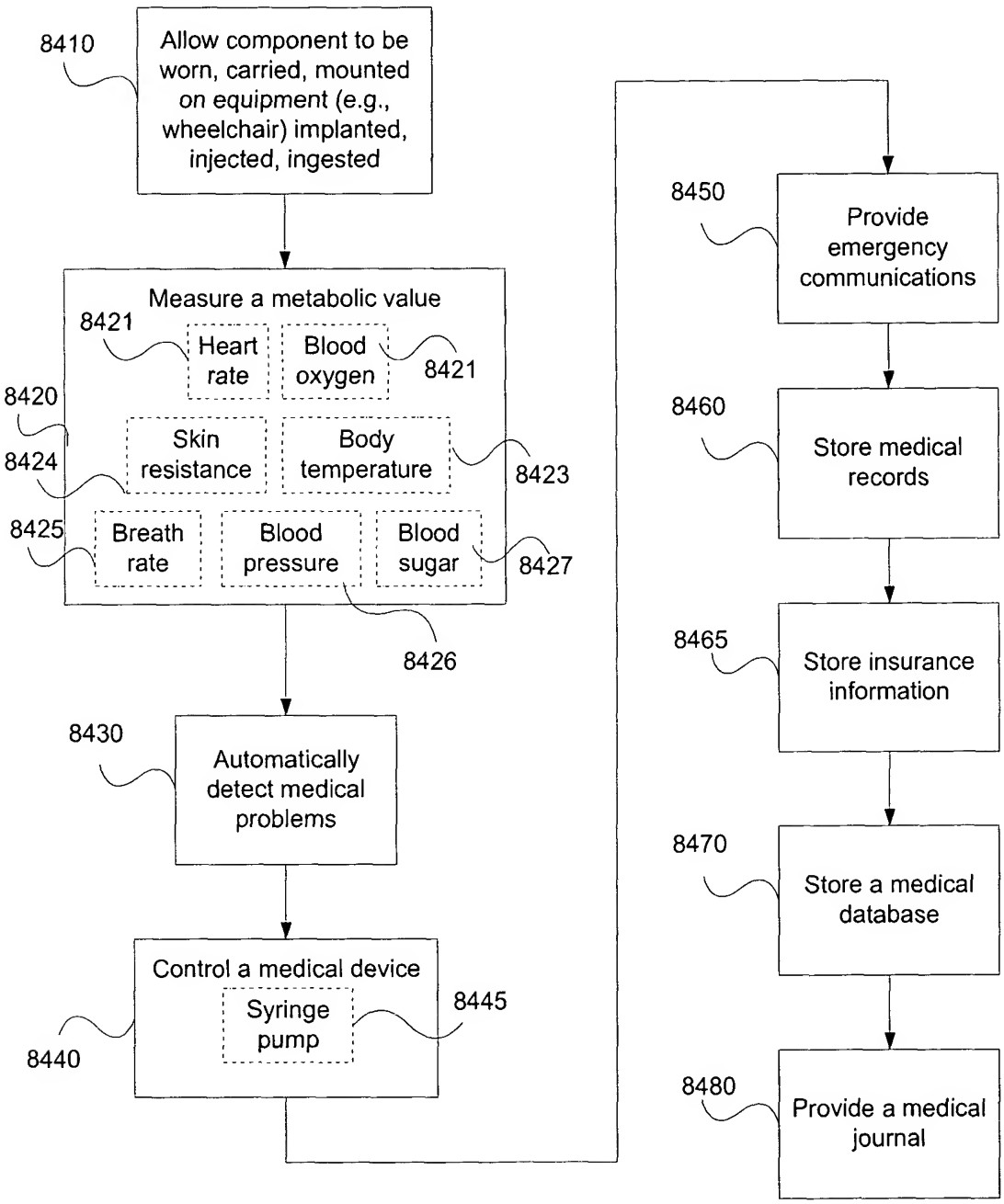
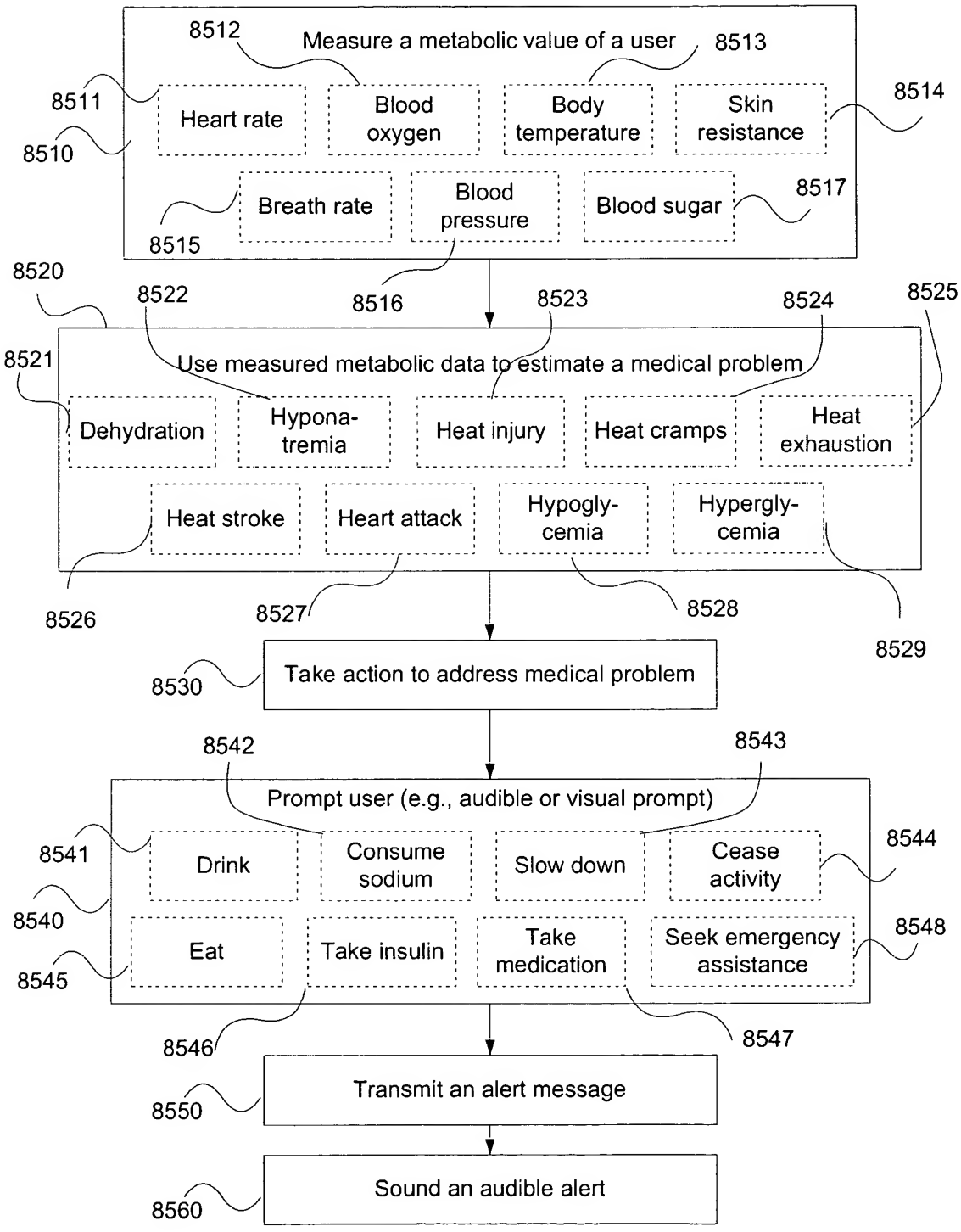
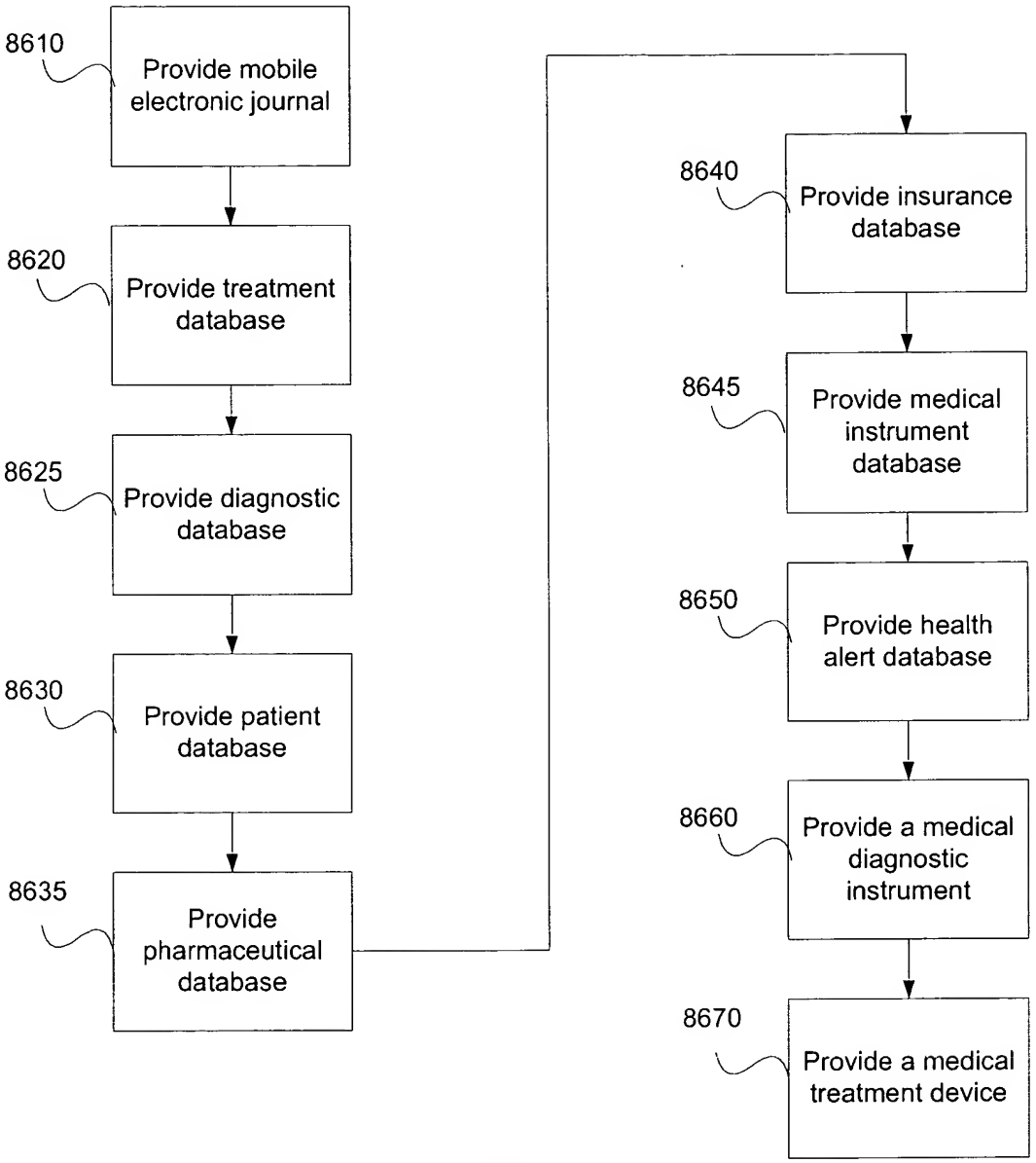

8410
Allow component to be worn, carried, mounted on equipment (e.g., wheelchair) implanted, injected, ingested
Measure a metabolic value
8421
Heart rate
Blood oxygen
8421
8420
Skin resistance
Body temperature
8423
8424
8425
Breath rate
Blood pressure
Blood sugar
8427
8426
8430
Automatically detect medical problems
Control a medical device
Syringe pump
8445
8440
8450
Provide emergency communications
8460
Store medical records
8465
Store insurance information
8470
Store a medical database
8480
Provide a medical journal

FIG 85


8512
Measure a metabolic value of a user
8513
8511
Heart rate
Blood oxygen
Body temperature
Skin resistance
8514
8510
Breath rate
Blood pressure
Blood sugar
8517
8515
8520
8522
8516
8523
8524
8525
8521
Use measured metabolic data to estimate a medical problem
Dehydration
Hypona-tremia
Heat injury
Heat cramps
Heat exhaustion
Heat stroke
Heart attack
Hypogly-cemia
Hyperglycemia
8526
8527
8528
8529
8530
Take action to address medical problem
8542
8543
Prompt user (e.g., audible or visual prompt)
8541
Drink
Consume sodium
Slow down
Cease activity
8544
8540
Eat
Take insulin
Take medication
Seek emergency assistance
8548
8545
8546
8547
8550
Transmit an alert message
8560
Sound an audible alert

8500

FIG 86


8610
Provide mobile electronic journal
8620
Provide treatment database
8625
Provide diagnostic database
8630
Provide patient database
8635
Provide pharmaceutical database
8640
Provide insurance database
8645
Provide medical instrument database
8650
Provide health alert database
8660
Provide a medical diagnostic instrument
8670
Provide a medical treatment device

8480

FIG 87

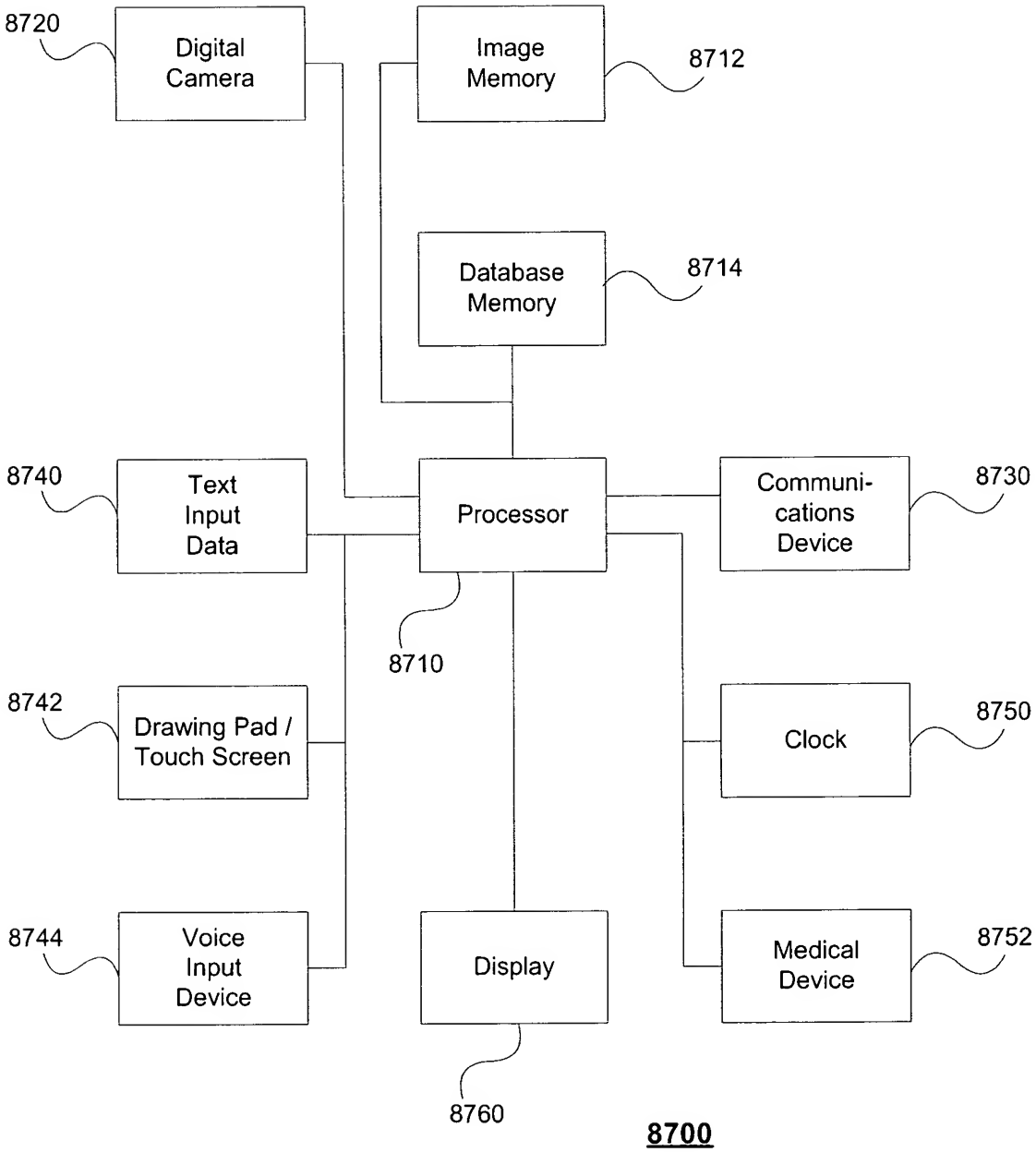
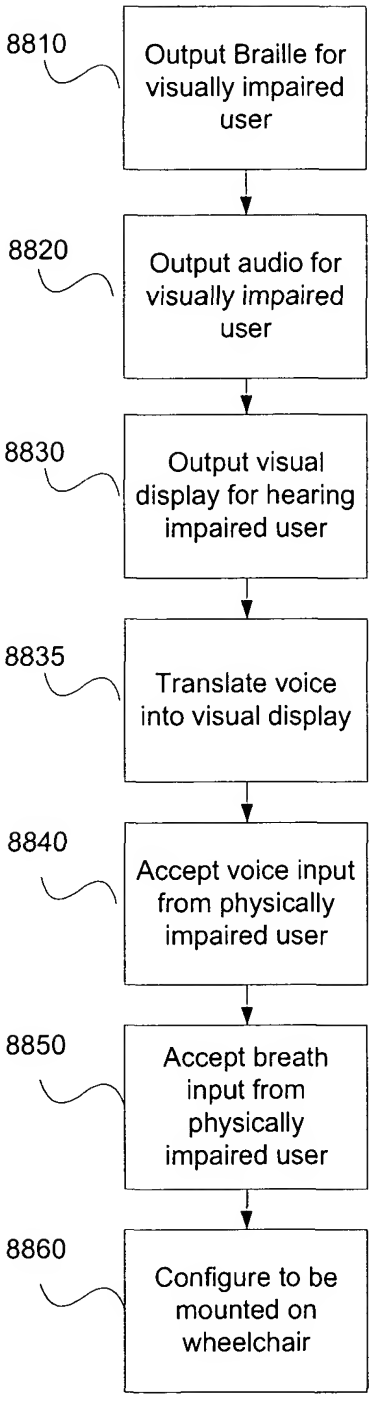
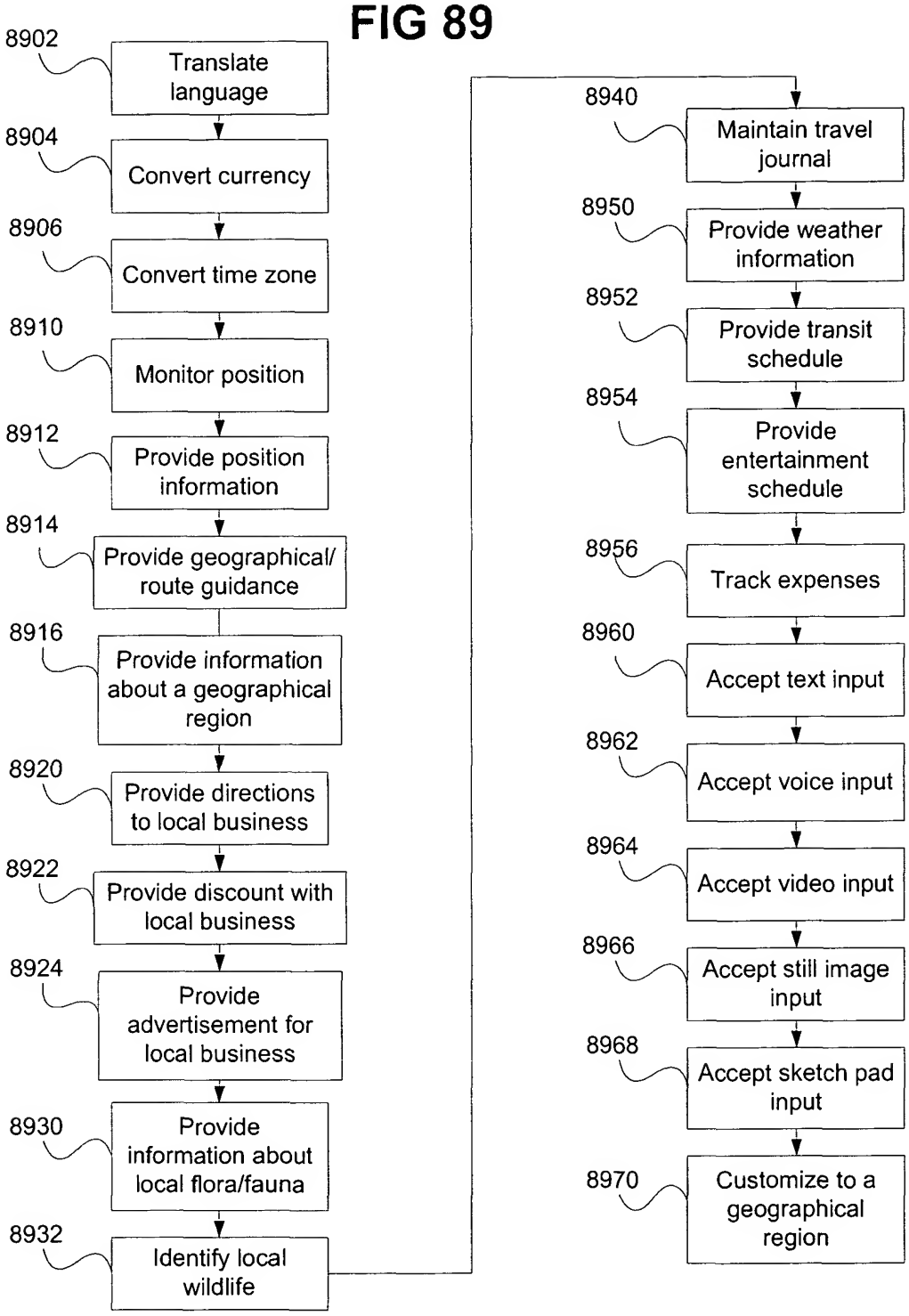

8720
Digital Camera
Image Memory
8712
Database Memory
8714
8740
Text Input Data
Processor
Communi-cations Device
8730
8710
8742
Drawing Pad / Touch Screen
Clock
8750
8744
Voice Input Device
Display
Medical Device
8752
8760
8700

FIG 88


8810
Output Braille for visually impaired user
8820
Output audio for visually impaired user
8830
Output visual display for hearing impaired user
8835
Translate voice into visual display
8840
Accept voice input from physically impaired user
8850
Accept breath input from physically impaired user
8860
Configure to be mounted on wheelchair

3260

FIG 89


8902
Translate language
8904
Convert currency
8906
Convert time zone
8910
Monitor position
8912
Provide position information
8914
Provide geographical/ route guidance
8916
Provide information about a geographical region
8920
Provide directions to local business
8922
Provide discount with local business
8924
Provide advertisement for local business
8930
Provide information about local flora/fauna
8932
Identify local wildlife
8940
Maintain travel journal
8950
Provide weather information
8952
Provide transit schedule
8954
Provide entertainment schedule
8956
Track expenses
8960
Accept text input
8962
Accept voice input
8964
Accept video input
8966
Accept still image input
8968
Accept sketch pad input
8970
Customize to a geographical region

3265

FIG 90

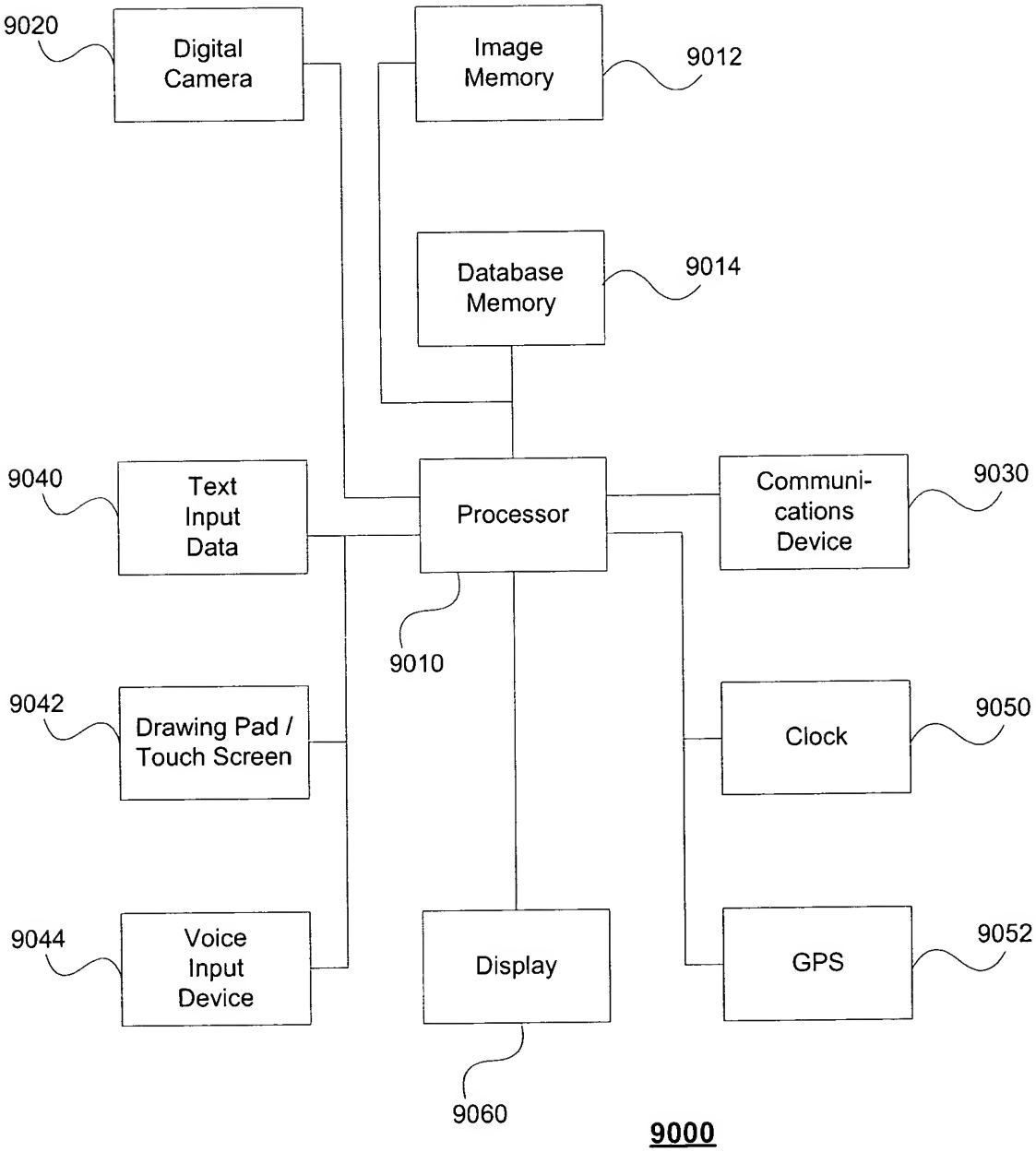
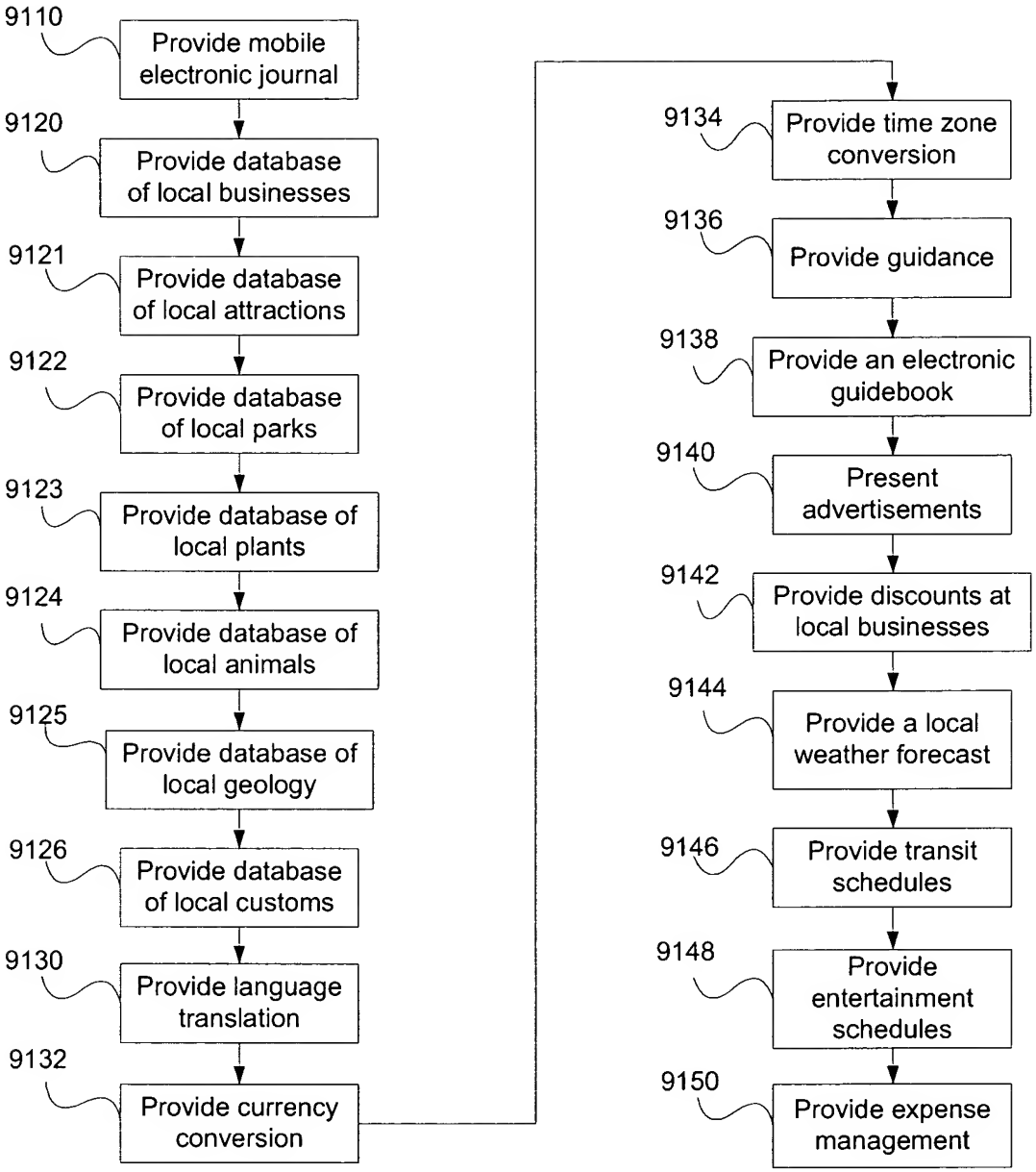

9020
Digital Camera
Image Memory
9012
Database Memory
9014
9040
Text Input Data
Processor
Communi-cations Device
9030
9010
9042
Drawing Pad / Touch Screen
Clock
9050
9044
Voice Input Device
Display
GPS
9052
9060
9000

FIG 91


9110
Provide mobile electronic journal
9120
Provide database of local businesses
9121
Provide database of local attractions
9122
Provide database of local parks
9123
Provide database of local plants
9124
Provide database of local animals
9125
Provide database of local geology
9126
Provide database of local customs
9130
Provide language translation
9132
Provide currency conversion
9134
Provide time zone conversion
9136
Provide guidance
9138
Provide an electronic guidebook
9140
Present advertisements
9142
Provide discounts at local businesses
9144
Provide a local weather forecast
9146
Provide transit schedules
9148
Provide entertainment schedules
9150
Provide expense management

8940

FIG 92

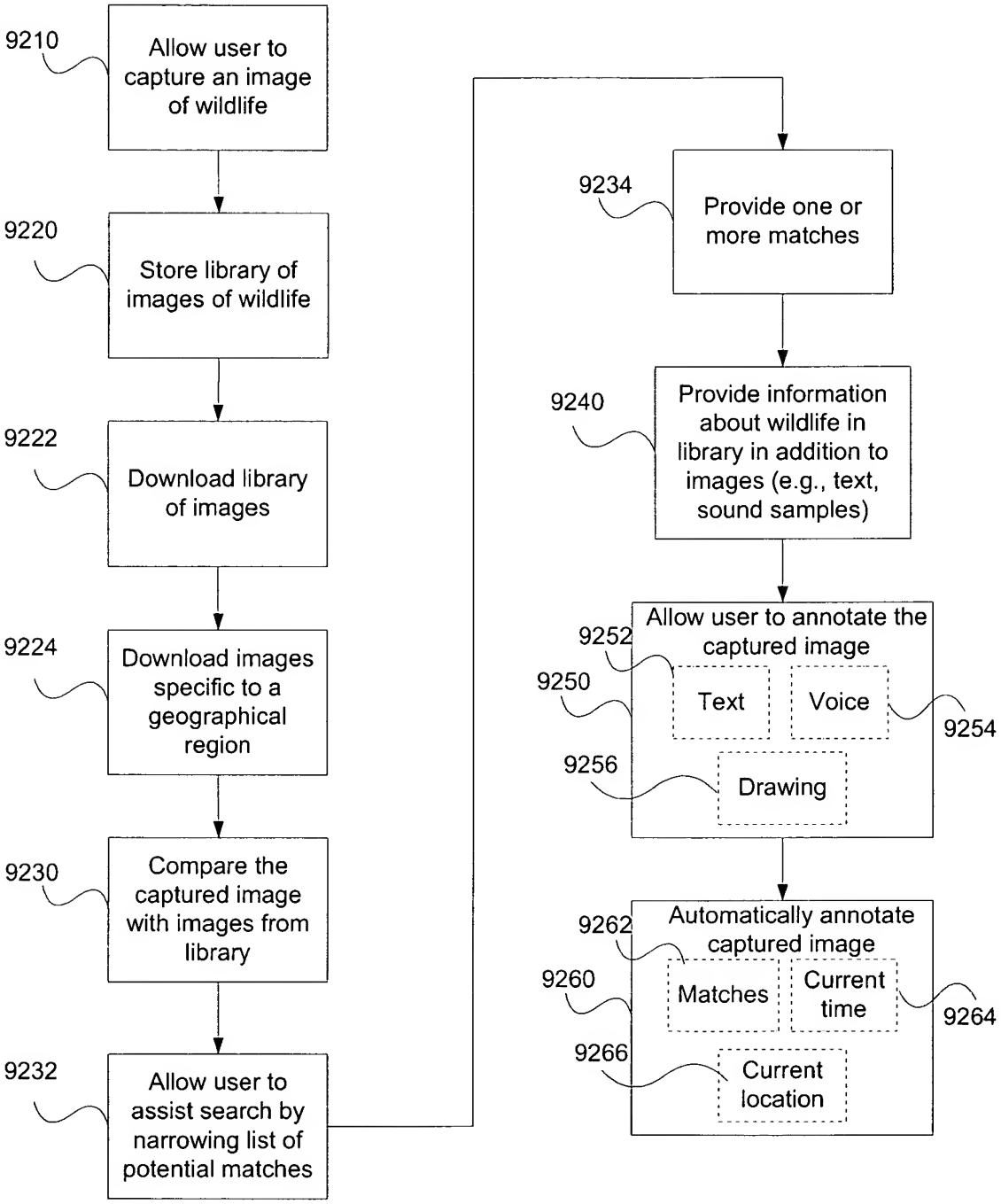
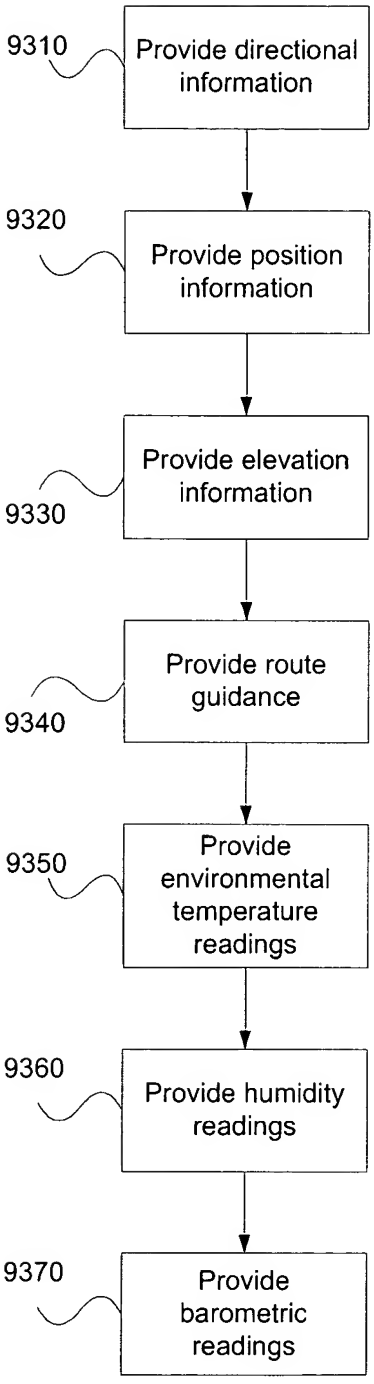
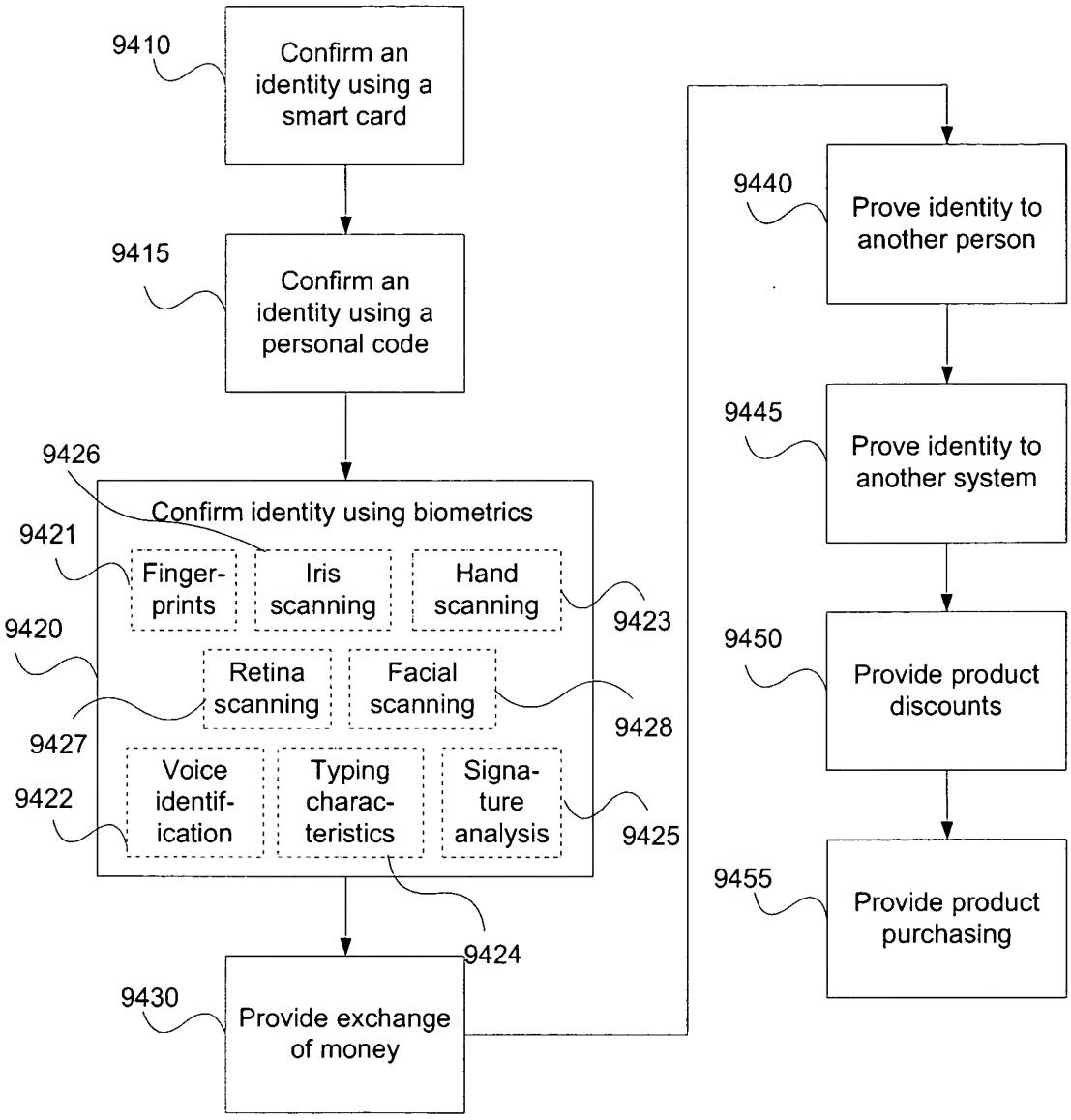

9210
Allow user to capture an image of wildlife
9220
Store library of images of wildlife
9222
Download library of images
9224
Download images specific to a geographical region
9230
Compare the captured image with images from library
9232
Allow user to assist search by narrowing list of potential matches
9234
Provide one or more matches
9240
Provide information about wildlife in library in addition to images (e.g., text, sound samples)
Allow user to annotate the captured image
9252
9250
Text
Voice
9254
9256
Drawing
Automatically annotate captured image
9262
9260
Matches
Current time
9264
9266
Current location

FIG 93


9310
Provide directional information
9320
Provide position information
Provide elevation information
9330
Provide route guidance
9340
Provide environmental temperature readings
9350
9360
Provide humidity readings
9370
Provide barometric readings

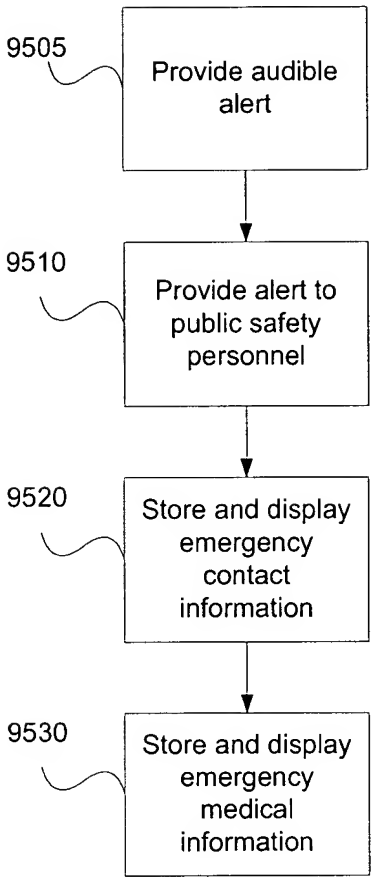
3225

FIG 94


9410
Confirm an identity using a smart card
9415
Confirm an identity using a personal code
9426
Confirm identity using biometrics
9421
Finger-prints
Iris scanning
Hand scanning
9423
9420
Retina scanning
Facial scanning
9428
9427
9422
Voice identif-ication
Typing charac-teristics
Signa-ture analysis
9425
9424
9430
Provide exchange of money
9440
Prove identity to another person
9445
Prove identity to another system
9450
Provide product discounts
9455
Provide product purchasing

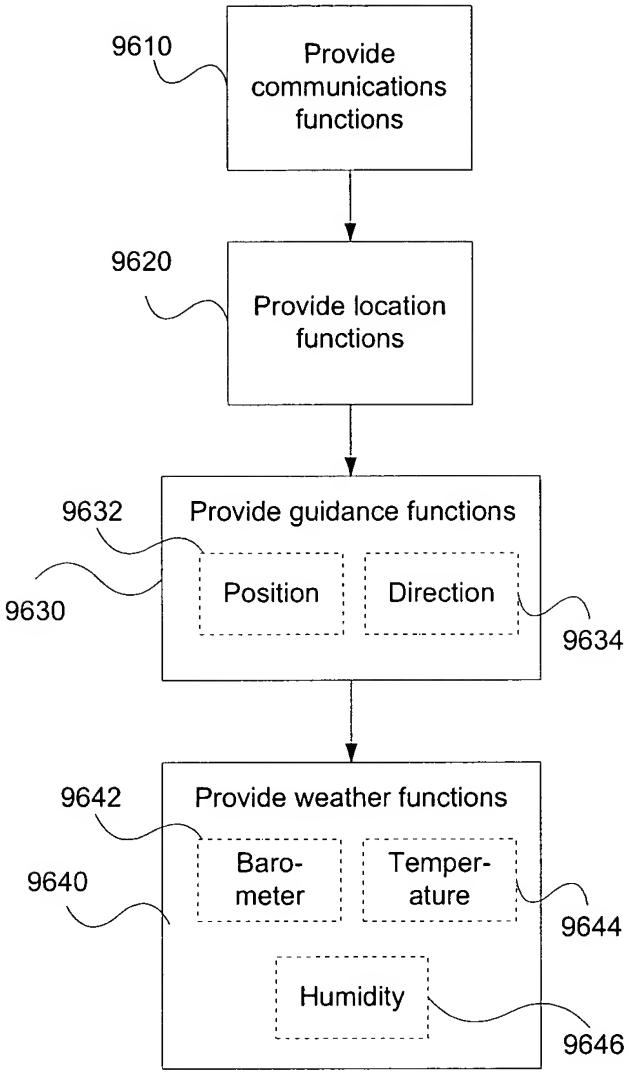
3240

FIG 95


9505
Provide audible alert
9510
Provide alert to public safety personnel
9520
Store and display emergency contact information
9530
Store and display emergency medical information

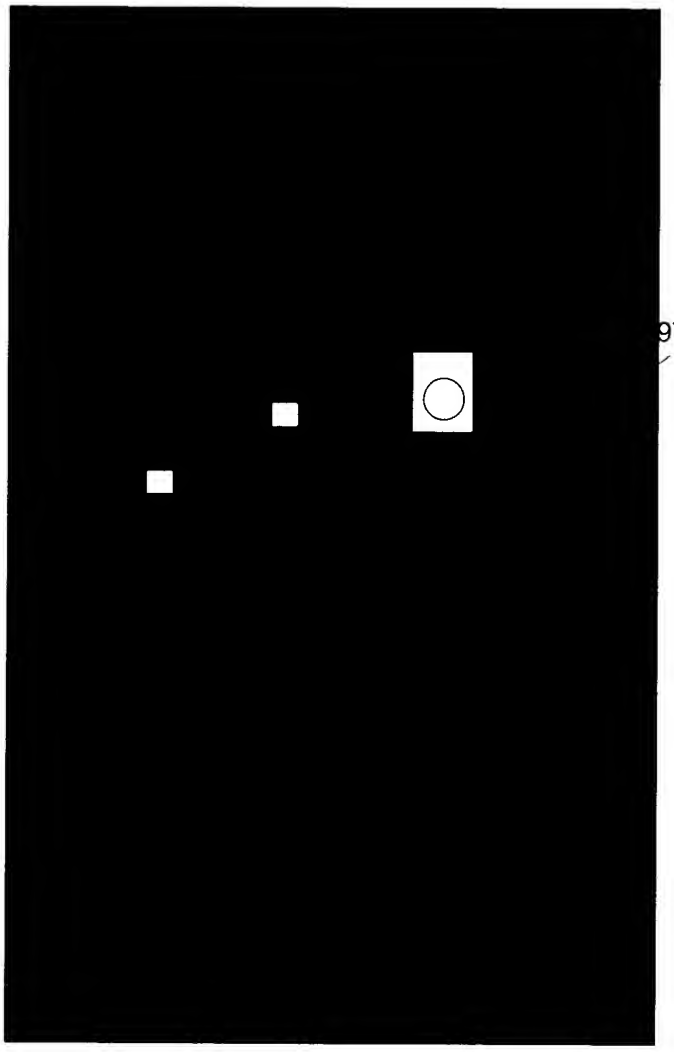
3245

FIG 96


9610
Provide communications functions
9620
Provide location functions
9632
Provide guidance functions
9630
Position
Direction
9634
9642
Provide weather functions
9640
Baro-meter
Temper-ature
9644
Humidity
9646

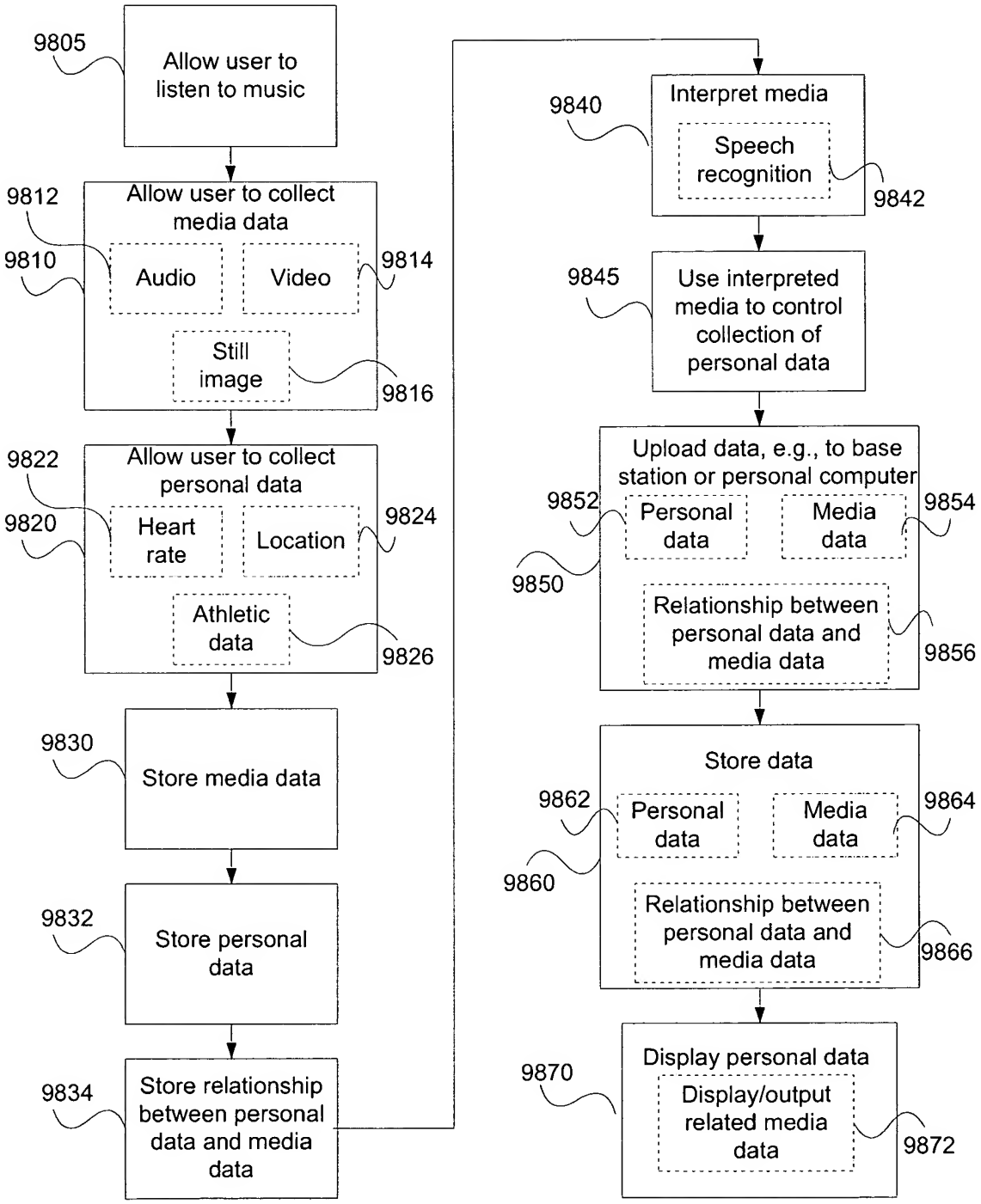
3250

FIG 97



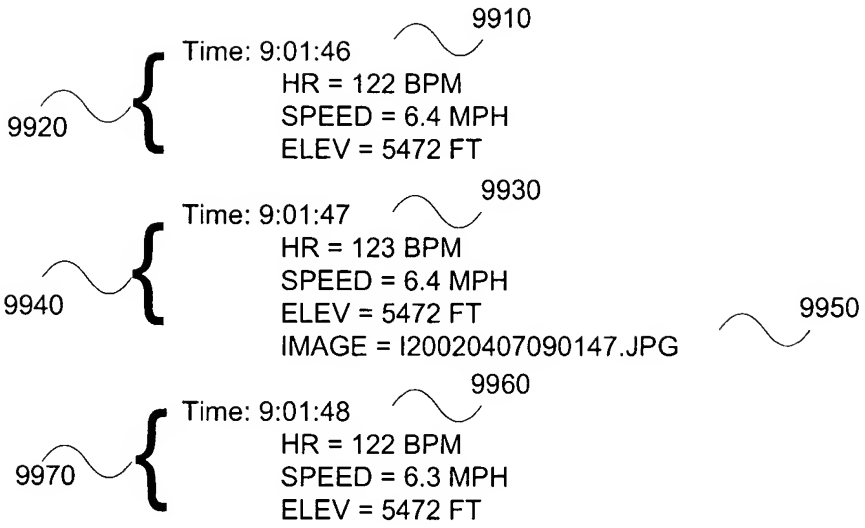
9700

FIG 98


9805
Allow user to listen to music
9812
Allow user to collect media data
9810
Audio
Video
9814
Still image
9816
9822
Allow user to collect personal data
9820
Heart rate
Location
9824
Athletic data
9826
9830
Store media data
9832
Store personal data
9834
Store relationship between personal data and media data
9840
Interpret media
Speech recognition
9842
9845
Use interpreted media to control collection of personal data
Upload data, e.g., to base station or personal computer
9852
Personal data
Media data
9854
9850
Relationship between personal data and media data
9856
Store data
9862
Personal data
Media data
9864
9860
Relationship between personal data and media data
9866
Display personal data
9870
Display/output related media data
9872

9800

FIG 99


9910
Time: 9:01:46
HR = 122 BPM
SPEED = 6.4 MPH
ELEV = 5472 FT
9920
9930
Time: 9:01:47
HR = 123 BPM
SPEED = 6.4 MPH
ELEV = 5472 FT
IMAGE = I20020407090147.JPG
9940
9950
9960
Time: 9:01:48
HR = 122 BPM
SPEED = 6.3 MPH
ELEV = 5472 FT
9970

9900

FIG 100

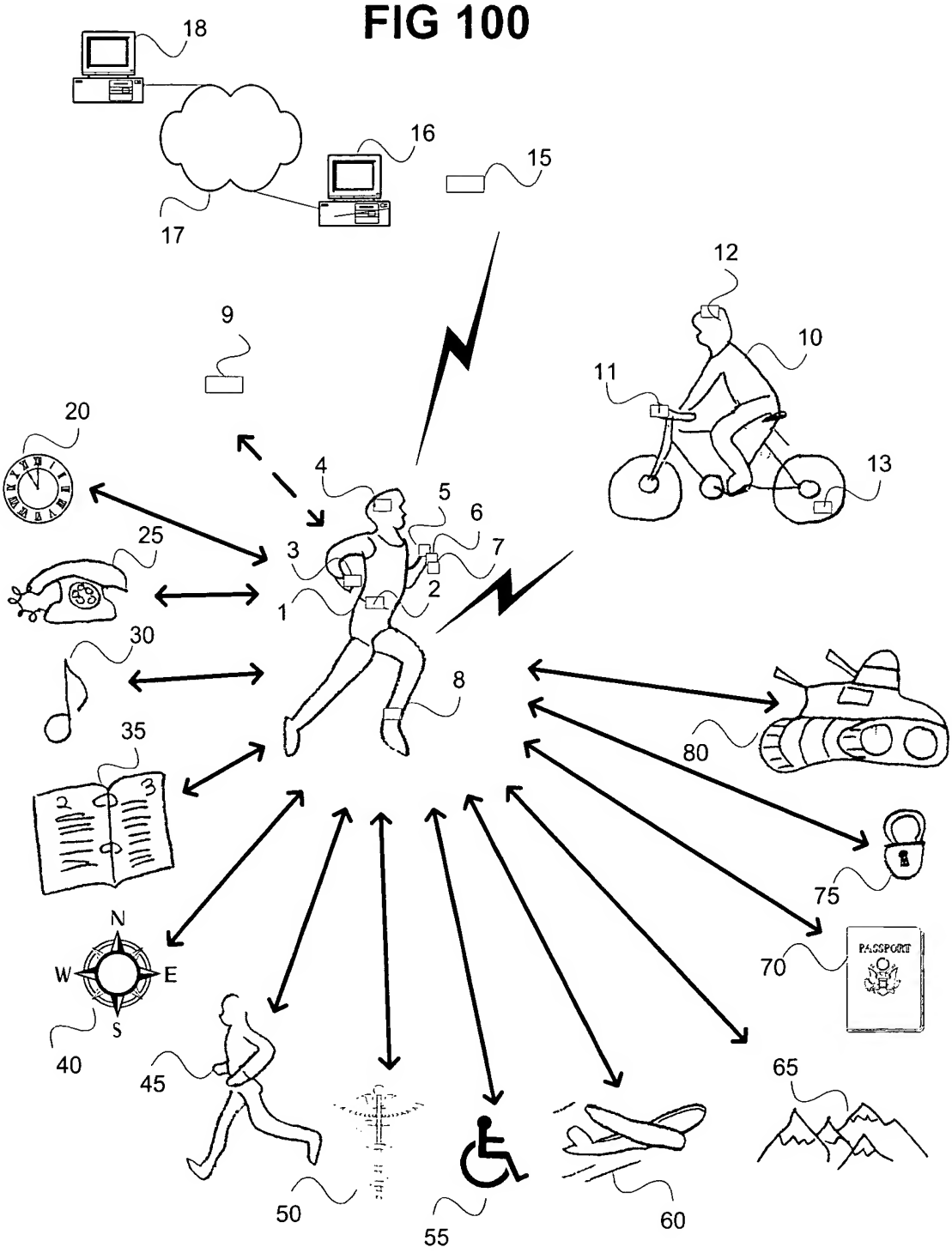

18
16
15
17
12
9
10
11
20
4
5
6
13
25
3
7
2
1
30
8
35
80
75
N
W
E
S
70
PASSPORT
40
45
65
50
55
60

FIG 101A

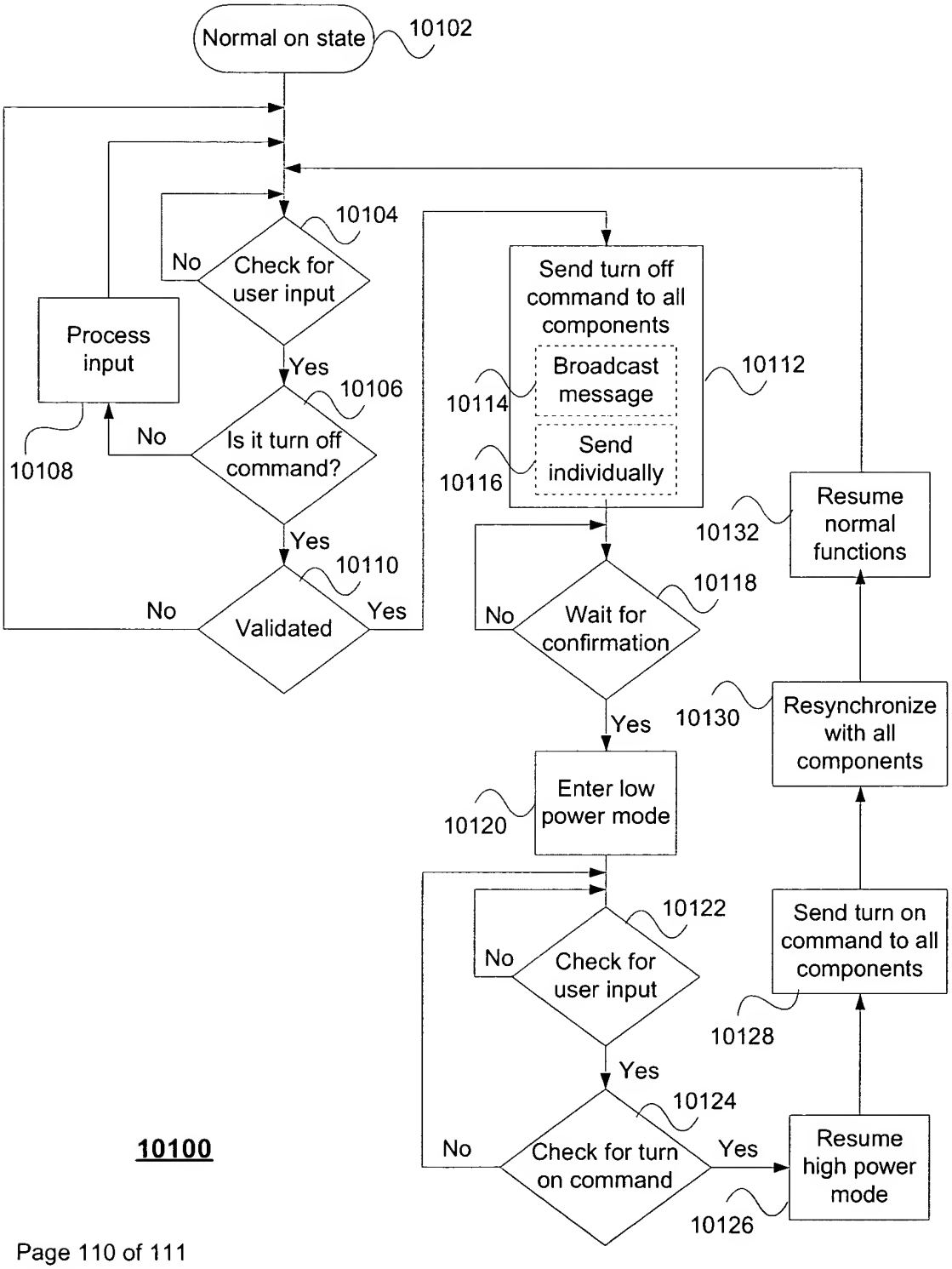
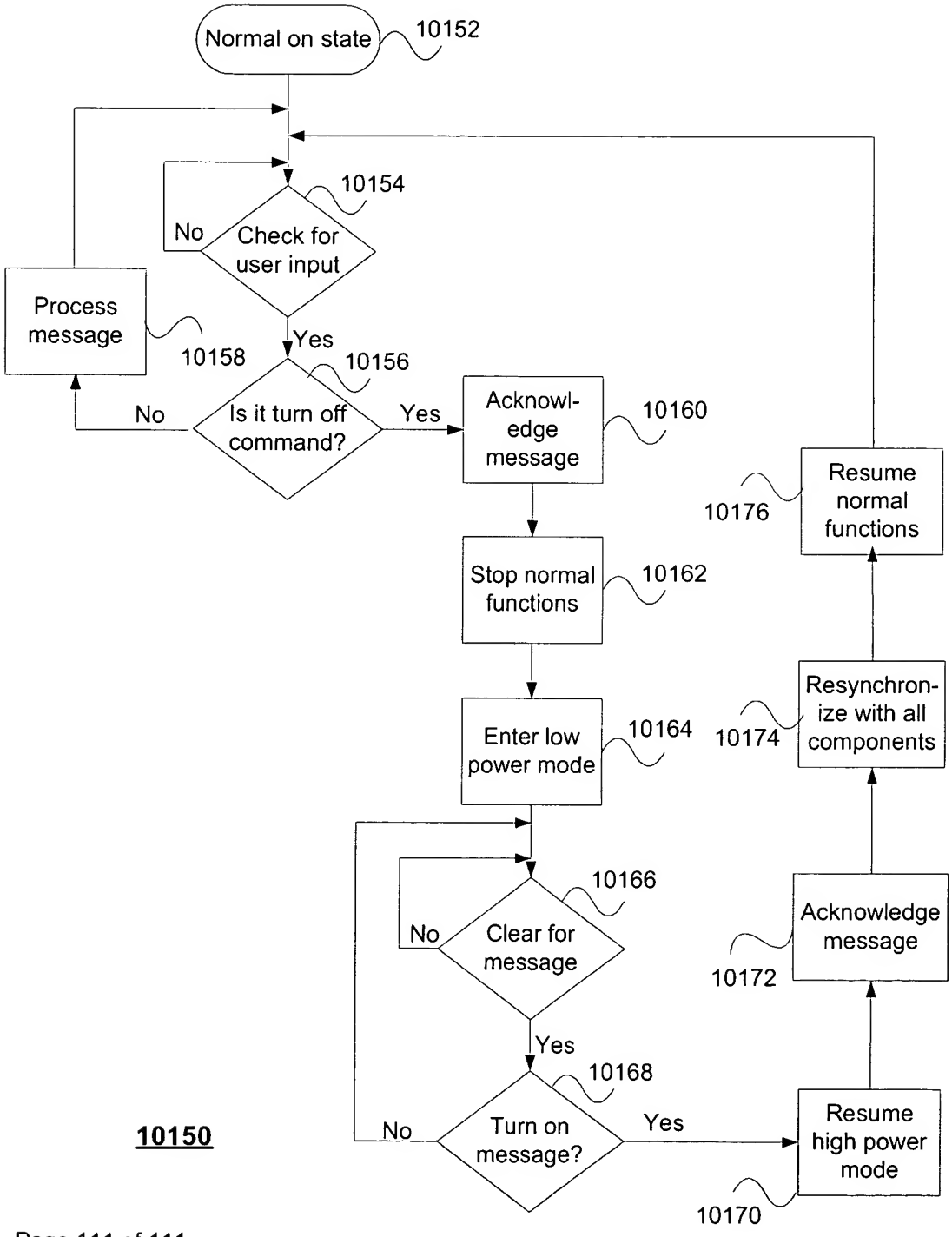

Normal on state
10102
10104
No
Check for user input
Yes
Process input
10108
10106
No
Is it turn off command?
Yes
10110
No
Validated
Yes
Send turn off command to all components
10112
Broadcast message
10114
Send individually
10116
10118
No
Wait for confirmation
Yes
10120
Enter low power mode
10122
No
Check for user input
Yes
10124
No
Check for turn on command
Yes
10126
Resume high power mode
10128
Send turn on command to all components
10130
Resynchronize with all components
10132
Resume normal functions
10100

FIG 101B


Normal on state
10152
10154
No
Check for user input
Process message
10158
Yes
10156
No
Is it turn off command?
Yes
Acknowl-edge message
10160
Stop normal functions
10162
Enter low power mode
10164
10166
No
Clear for message
Yes
10168
No
Turn on message?
Yes
10150
Resume high power mode
10170
Acknowledge message
10172
Resynchron-ize with all components
10174
Resume normal functions
10176